JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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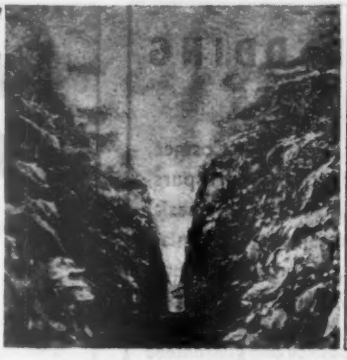

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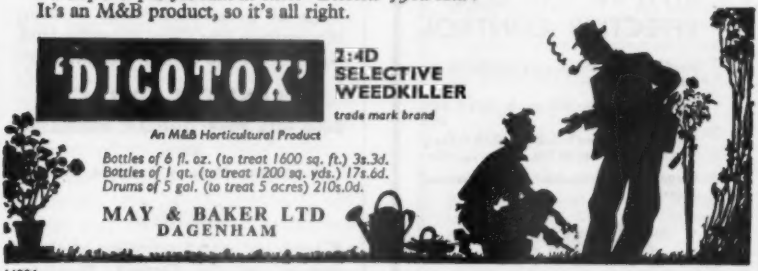

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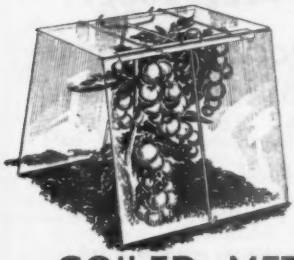

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Extracts from
THE PROCEEDINGS OF
THE ROYAL HORTICULTURAL SOCIETY

MARCH 20, 1951

SCIENTIFIC COMMITTEE—Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and nine other members present.

Bent leaves of Crocus.—Dr. B. Barnes exhibited a specimen of the Dutch Yellow Crocus, some leaves of which had a marked double bend near the tip. Such leaves were sometimes found on plants in the garden. Those exhibited had been artificially induced by planting the corm on its side in a pot so that the emerging shoot struck the side of the pot before turning upwards. This suggested that the bend was caused by resistance to the young shoot.

Rhododendron Beanianum.—Mr. P. M. Synge exhibited a specimen of *Rhododendron Beanianum* with enations on the inside of the calyx which could be regarded as rudiments of a second calyx.

Bulblets on scales of Lilium Henryi.—Mr. G. W. Darby exhibited a bulb scale of *Lilium Henryi* which had been treated with colchicine. There were three well-developed bulblets at the base of the scale and numerous rudimentary bulblets on the face of the scale.

Galanthus and Colchicum under Snow.—Mr. R. D. Trotter stated that when a fall of snow covered his garden in Inverness on November 10, 1950, *Galanthus Olgae* was in full flower. When the snow melted on January 12, the flowers thus held in cold storage were undamaged. *Colchicum agrippinum*, the flowering of which had likewise been interrupted by this snow, had begun to flower again after its disappearance.

Plants from Greece.—Attention was called to an exhibit in the Fortnightly Show of Greek wild flowers gathered on Mt. Parnes, Attica, by Mr. Mark Ogilvie-Grant and sent by air-mail. The Committee examined with particular interest *Symphytum bulbosum* with remarkably long protruding corolla appendages and *Orchis italica* which in the form of the lip recalls *O. militaris* and *Aceras anthropophorum*.

FLORAL COMMITTEE A—Mr. G. W. Leak, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended:

Silver-gilt Flora Medal

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Daffodils, Tulips, Fritillarias, Ericas, etc.

Silver Flora Medal

To Mr. J. Amand, Holbeach, for an exhibit of Lilacs, Tulips, Freesias, Anemones and Roses.

Silver Banksian Medal

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Daffodils, Tulips, Crocuses and Freesias.

To Messrs. Dobbie & Co. Ltd., Edinburgh, for an exhibit of Tulips, Daffodils, Hyacinths, etc.

To Messrs. Wakeley Bros. & Co., Ltd., North Mymms, for an exhibit of Daffodils, Tulips, Crocuses, etc.

Flora Medal

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Polyanthus and coloured Primroses.

To Messrs. W. A. Constable, Ltd., Tunbridge Wells, for an exhibit of Daffodils, Hyacinths, Lachenalias, Crocuses, etc.

To Messrs. E. Webb & Sons (Stourbridge), Ltd., Stourbridge, for an exhibit of Tulips, Daffodils, Crocuses, etc.

Banksian Medal

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of Daffodils, Tulips, Primroses, etc.

Other Exhibit:

Primroses, Anemones, etc., from Mr. C. Newberry, Knebworth.

FLORAL COMMITTEE B—Lord ARMSTRONG, C.B.E., LL.D., V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended:

Silver-gilt Banksian Medal

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering trees and shrubs.
To Messrs. Six Hills Nursery, Ltd., Stevenage, for an exhibit of Primulas and Saxifrages.
To the Waterperry School of Horticulture, Wheatley, Oxford, for an exhibit of rock garden plants.

Silver Lindley Medal

To Mr. Clint McDade, Chattanooga, Tennessee, U.S.A., for a collection of Camellias presented by him to the Society and exhibited from Wisley.

Silver Flora Medal

To Messrs. B. Gill & Son, Penryn, for an exhibit of Camellias.
To Messrs. Haskins Bros., Bournemouth, for an exhibit of Camellias.
To Messrs. R. C. Notcutt, Ltd., Woodbridge, for an exhibit of flowering trees and shrubs.
To Sir Henry Price, Ardingly, for an exhibit of Rhododendrons.
To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of Camellias and other flowering shrubs.
To Messrs. Sunningdale Nurseries, Windlesham, for an exhibit of Rhododendrons and Camellias.
To Messrs. Waterer, Sons & Crisp, Ltd., Bagshot, for an exhibit of Azaleas and other flowering shrubs.

Silver Banksian Medal

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of flowering trees and shrubs.
To Messrs. G. & A. Clark, Ltd., Dover, for an exhibit of flowering shrubs and hardy plants.

Lindley Medal

To Mr. Mark Ogilvie-Grant, 4 Academy St., Athens, for an exhibit of Greek wild flowers.
To Messrs. C. H. Taudevin, Ltd., Wirral, for an exhibit of species of Eucalyptus.

Flora Medal

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering trees and shrubs.
To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.
To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of rock garden plants.
To Messrs. MacPenny Nurseries, Bransgore, for an exhibit of hardy plants and shrubs.
To Mr. W. J. Marchant, Wimborne, for an exhibit of flowering trees and shrubs.
To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of rock garden plants and shrubs.
To Messrs. Sale & Son (Wokingham), Ltd., Wokingham, for an exhibit of flowering trees and shrubs.
To Messrs. D. Stewart & Son, Ltd., Ferndown, for an exhibit of flowering trees and shrubs.
To Messrs. D. Stewart & Son, Ltd., Ferndown, for an exhibit of bulbous plants.
To Messrs. J. Waterer, Sons & Crisp, Ltd., Bagshot, for an exhibit of rock garden plants.
To Messrs. Winkfield Manor Nurseries, Ascot, for an exhibit of rock garden plants.

Banksian Medal

To Messrs. Balcombe Nurseries, Swallowfield, for an exhibit of rock garden plants.
To Messrs. Hollybush Nurseries, Harpenden, for an exhibit of rock garden plants.
To Messrs. M. P. Kooper & Son, Ferndown, for an exhibit of rock garden plants and shrubs.
To Messrs. Maxwell & Beale, Ltd., Broadstone, for an exhibit of flowering shrubs.
To Messrs. Old Welwyn Gardens, Welwyn, for an exhibit of rock garden plants.
To Messrs. Clifford Proctor Nurseries, Ltd., Chesterfield, for an exhibit of flowering shrubs.
To Messrs. Robinson's Gardens, Ltd., Eltham, for an exhibit of rock garden plants.

Other Exhibits:

Camellia saluenensis 'Bow Bells,' exhibited by Mr. W. J. Marchant, Wimborne.
Camellia japonica 'Yaibijoro,' *Prunus* × 'Kursar' (*P. kurilensis* × *P. Sargentii*), exhibited by Capt. Collingwood Ingram, Benenden.
Camellias for naming, sent by Messrs. D. Stewart & Son, Ferndown, and Messrs. Geo. Jackman & Son, Ltd., Woking.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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June 1951

THE SECRETARY'S PAGE

ANNOUNCEMENTS—JUNE AND JULY

Shows

TUESDAY, June 12 12 NOON to 7 P.M. WEDNESDAY, June 13 10 A.M. to 5 P.M.	Fortnightly Show. British National Carnation Society's Pink Competition.
TUESDAY, June 26 12 NOON to 7 P.M. WEDNESDAY, June 27 10 A.M. to 5 P.M.	Fortnightly Show. Flowering Tree and Shrub Competition. National Cactus and Succulent Society's Competition.
TUESDAY, July 10 12.30 P.M. to 7 P.M. WEDNESDAY, July 11 10 A.M. to 5 P.M.	Fortnightly Show. Fruit and Vegetable Show. Cactus and Succulent Society's Competition.
TUESDAY, July 31 12 NOON to 7 P.M. WEDNESDAY, August 1 10 A.M. to 5 P.M.	Fortnightly Show.

Lectures

TUESDAY, June 12 at 3 P.M. "Garden Pinks" by MR. M. C. ALLWOOD, F.L.S., V.M.H.

TUESDAY, June 26 at 3 P.M. "Modern Delphiniums and their Culture" by MR. ALLAN LANGDON.

TUESDAY, WEDNESDAY and THURSDAY, July 10, 11 and 12. Conference on the Breeding of Garden Plants (see page 178).

TUESDAY, July 31 at 3 P.M. "Lilies, Nomocharis and Fritillarias" by CAPTAIN F. KINGDON-WARD, B.A., F.R.G.S., F.L.S., V.M.H.

Demonstrations at Wisley—The following demonstrations will be given at Wisley, that on the second day being in each case a repetition of that given on the first:—

Fruit Garden

July 4, 5. Summer Pruning of Fruit Trees. (Commencing at 2 P.M.)

Refreshments at Wisley—In reponse to the many requests for catering arrangements to be made for the convenience of visitors to the Gardens, it has now been arranged for refreshments to be available during the afternoon of every day (including Sundays). If this service proves to be popular it is hoped to continue it until the end of the summer.

Set teas, sandwiches and other light refreshments will be served near the Herbaceous Borders. It is regretted that at present lunches cannot be served. The Society cannot accept responsibility for reserving tables.

Owing to circumstances outside the Society's control, it was not possible to commence the services of refreshments on May 1 as announced.

The Daffodil Year Book 1950—Since publication of this Year Book the Society has been informed by the solicitors to MR. J. C. MARTIN that 'Silver Chimes' was raised as well as registered by him and his late father.

CONFERENCE ON THE BREEDING OF GARDEN PLANTS

THE Conference will be held in the Lecture Room of the New Hall in Greycoat Street, Westminster, on July 10, 11 and 12, when papers will be given by experts on Plant Breeding. On July 13 and 14 there will be day excursions by motor-coach.

Anyone interested in Plant Breeding is invited to become a member of the Conference and should write to the Secretary for a programme giving details and containing application forms for membership and excursions.

PROGRAMME OF LECTURES

Tuesday, July 10

3 P.M. *Chairman:* LORD ABERCONWAY, C.B.E., LL.D., V.M.H.

Speaker: PROF. S. C. HARLAND, F.R.S. (University of Manchester).

Subject: "The Origin of Garden Plants."

Wednesday, July 11

10.30 A.M. *Chairman:* DR. H. V. TAYLOR, C.B.E., V.M.H.

Speakers: PROF. K. MATHER, F.R.S. (University of Birmingham) and PROF. S. J. WELLENSIEK (State Agricultural College, Wageningen, Holland).

Subject: "Genetics and Plant Breeding."

2 P.M. *Chairman:* MR. M. B. CRANE, F.R.S., A.L.S., V.M.H. (The John Innes Horticultural Institution).

Speakers: MR. A. P. BALFOUR, DR. W. BLACK (Scottish Society for Research in Plant Breeding), M. R. DE VILMORIN, MR. A. LANGDON, MR. W. R. LESLIE (Dominion Experimental Station, Morden, Manitoba), MR. H. PLUMLEY, MR. J. WOOLMAN and DR. D. WYMAN on behalf of DR. KARL SAX (The Arnold Arboretum).

Subject: "Discussion on Plant Breeding."

Thursday, July 12

10.30 A.M. *Chairman:* COL. F. C. STERN, O.B.E., M.C., F.L.S., V.M.H.

Speakers: DR. C. D. DARLINGTON, F.R.S. (The John Innes Horticultural Institution) and DR. G. A. L. MEHLQUIST (The Missouri Botanic Garden).

Subject: "Cytology and Plant Breeding."

2 P.M. *Chairman:* DR. C. D. DARLINGTON, F.R.S.

Speakers: PROF. P. T. THOMAS (University College of Wales) and DR. S. L. EMSWELLER (U.S.A. Plant Industry Station, Beltsville).

Subject: "Developments in Plant Breeding due to the use of Colchicine and other techniques."

A Report of the Conference will be published as soon as possible after the close. Details will be announced in the JOURNAL. Inquiries should be addressed to the Secretary.

DAY EXCURSIONS BY MOTOR COACH

Friday, July 13

Excursion to the John Innes Horticultural Institution, Bayfordbury, Hertford, Herts, thence to The Hertfordshire Institute of Agriculture, Oaklands, St. Albans, and to the Orchid Nursery of Messrs. Sanders (St. Albans) Ltd.

Saturday, July 14

Excursion to The Royal Horticultural Society's Gardens, Wisley, Surrey, thence to the Trial Grounds of Messrs. Sutton & Sons Ltd. at Slough and their premises at Reading.

N.B.—These excursions have been planned primarily for those actively engaged in the breeding of garden plants and the number of seats on the coaches is limited. The Council reserves the right to use its discretion in the allocation of vacancies.

WISLEY IN JUNE

JUNE is one of the most lovely months in this garden, the diversity of plants in flower making it difficult to give a comprehensive picture in a short article; but although it is safe to predict that visitors will find much to delight them in all sections of the Gardens, flowering shrubs and trials of hardy plants will be of special interest.

Visitors may like to begin their tour with the greenhouses. The Half Hardy House has received a considerable amount of attention during the past winter and here we find two members of the Malvaceae —Abutilons and the orange-coloured *Sphaeralcea Fendleri* which has recently been figured in the *Botanical Magazine* (N.S.t.140). This plant is said to be the commonest member of the genus in New Mexico and Arizona extending into South Colorado and West Texas. It will survive out of doors in sheltered districts and is of easy culture; the old stems should be cut back to the base in the autumn when it will break again in April. Among other plants in the house are *Anigozanthos flavida*, or Kangaroo Paw, the pink clustered heads of *Pimelea ferruginea*, two Alstroemerias, *A. Pelegrina* var. *rosea* and *A. haemantha* and the charming *Dimorphotheca Ecklonis*, the white ray florets shaded with slaty-blue in the reverse. The Temperate House is exceptionally colourful just now; in the centre bed *Cassia corymbosa* and *Cestrum aurantiacum* are both decked with yellow blossom, and trained against the glass are varieties of *Gloriosa superba*, *Fuchsia* 'Rose of Castile' and that notable Costa Rican plant *Solanum Wendlandii* carrying large panicles of heliotrope flowers. The side staging is gay with a variety of plants, notably *Mimulus aurantiacus*, brilliantly coloured *Hibiscus Rosa-sinensis* varieties and two members of the Asclepiadaceae, the Argentinian *Oxypetalum caeruleum*, whose clear blue flowers are seldom seen in cultivation, and the yellow and orange *Asclepias curassavica* from Tropical America. The Stove House is well stocked with a variety of ornamental flowering and foliage plants.

Near here the trial beds of bearded Irises present many lovely modern varieties, while on the other side of a Lavender-bordered path is a bed of old-fashioned Rose varieties whose charm and delightful scent, so sadly lacking in many of the newer hybrids, will at once be appreciated.

The Herbaceous Borders begin their lengthy display with the useful blue-flowered *Salvia* × *superba* and its attractive ally *S. haematodes* whose branching flower-spikes of bright mauve rise high above a basal rosette of leaves. *Lychnis chalcedonica* gives bold splashes of colour to a white background created by the tall feathery flowers of *Cimicifuga racemosa* and the ivory-coloured herbaceous *Clematis recta*.

Those who have time for a longer visit will enjoy a walk through the fragrant-smelling Pinetum to Howard's Field, where there are numerous flowering shrubs and Rose species, returning to Seven Acres by way of a pleasant path beside the river bank.

The flowering shrubs in Seven Acres are looking particularly charming at the moment; pink and white Spiraeas, Philadelphus species, Deutzias and Escallonias mingle together in delightful informality. The heaths are out of flower now, but their place is taken by Genista and

Cytisus hybrids with Cistuses grouped around them. Among the latter is *C.* × *cyprius* with white flowers three inches across blotched with blood red in the centre. Another fine hybrid is *C.* × *purpureus*, the diaphanous purplish-pink flowers spotted dark red. *C.* × 'Silver Pink' is a hybrid of garden origin, the parents probably being *C. laurifolius* and a form of *C. villosus*, the combination of these two giving a plant about eighteen inches high with flowers of an attractive soft pink.

In the Award of Garden Merit Collection the rush-like stems of the Spanish Broom *Spartium junceum* are bearing terminal racemes of bright yellow, fragrant flowers. Seed is the only reliable method of propagation as the plant dislikes root disturbance. Another attractive Broom, *Genista cinerea*, is a native of Madeira, first brought to this country in 1777 by FRANCIS MASSON, when it was grown as a greenhouse plant, but later proving to be quite hardy. The vigorous old Rose hybrid 'Fellemberg' is producing clusters of rosy-crimson flowers, while 'Kirsten Poulsen' flaunts single scarlet blooms. The name *Lilium umbellatum*, now, unfortunately, to be replaced by the unfamiliar *hollandicum*, covers a race of hybrid, easily grown Lilies, which bear a profusion of gay orange and crimson flowers at this season. Also flowering here is a fine Deutzia, recommended for general garden culture, the white *D. scrabra plena*.

Entering the Wild Garden, visitors are greeted by a delightful woodland scene where Lilies, Foxgloves, Primulas, *Campanula latifolia*, the Spotted Orchis and the beautiful blue Poppy, *Meconopsis betonicifolia*, grow together beneath the Oak trees. The Lilies are worthy of special mention: *L. Szovitsianum* grows in quantity here, having large pendulous flowers of Empire Yellow, while one of the very best is a tangerine-coloured Lily of the Martagon type, *L. Hansonii*, a native of Korea. Some hybrids with this Lily and *L. Martagon* known as the 'Backhouse Hybrids' and *L.* 'Marhan' may also be seen as well as the lemon-coloured *L. Parryi* and graceful *L. columbianum*. Towering above them all are the majestic spikes of *L. giganteum*. There are some shrubs flowering, too, for instance the well-known specimens of *Kalmia latifolia* and the more compact *K. angustifolia*, also *Cornus Kousa*, *Rhododendron discolor* and the charming hybrid of unknown origin *R.* × *azaleoides*, with fragrant, lilac-pink flowers. The genus Stewartia is represented by *S. Malacodendron*, *S. Pseudo-camellia* and *S. serrata*. They are closely related to the Camellias and all bear white flowers.

We now leave the cool shadows for the flower-strewn terraces of the Rock Garden where the margins of the long ponds are lined with irises, and bright patches of *Mimulus* 'Whitecroft Scarlet,' echoed by *Primula Cockburniana*, are the first to catch the eye. There are many other Primulas besides this one, such as *P. aurantiaca*, *P. capitata*, *P. luteola*, *P. nutans* and *P. secundiflora*. There are numerous colourful patches of Aethionemas, the golden-yellow *Hypericum olympicum gracile*, *Veronica rupestris*, Saxifrages, Dianthus and Campanulas. *Silene alpestris* is a native of the Carpathians and low elevations in the Tyrol, producing starry white blooms on dainty branching stems. It is growing beside the indestructible *Allium Moly* whose loose heads of golden-yellow flowers on eight-inch-high stems make it one of the best of the

genus. This plant is found wild in shady woods in Spain. *Roscoea cautleoides* is an aristocrat of the rock garden, carrying spikes of clear luminous yellow panicled flowers. *R. Humeana* is also here, the blooms being larger and purple in colour.

Further rock plants are to be seen in the Alpine House, including two Alliums, *A. acuminatum* and the delightful *A. narcissiflorum* with pendent purple bells. Two plants to which protection is essential are the Tasmanian *Stylidium graminifolium* and the New Zealand *Anthropodium candidum* which has white flowers and grassy leaves. Also flowering are *Verbena tenera*, *Rhodohypoxis Baurii*, *Zephyranthes aurea* and the best annual Campanula for the alpine house, *C. Broussonetiana*.

Outside the House the beds of Cistus are flowering, as are the trials of Dianthus. On Weather Hill the long Rose borders attract many visitors ; while at the foot of the hill the trial beds of Delphiniums, Lupins, Sweet Peas and Rhododendrons will all repay close inspection.

WILD AND NATURAL GARDENING

V. Sackville-West, C.H.

(*Lecture given on March* 6, 1951; THE HON. LEWIS PALMER *in the Chair*)

THE title of this lecture was suggested to me by the Council of the R.H.S. and rather rashly I accepted the challenge. It is so easy in September 1950 to engage oneself to speak in March 1951; the date seems so safely far away. But as it drew nearer I began to wonder what exactly had been meant, and to this moment I am still not quite sure.

I had recently the pleasure of taking part in a discussion between the members of a club or society at a large agricultural and horticultural college. I don't see why I should not say where it was; it was at Wye College in Kent. They were all young people—I suppose their ages ranged from eighteen to twenty-five—of both sexes, a group of eager, intelligent youth all intending to make gardening their profession. The idea was that I should address a few opening remarks to them and should then throw some provocative ball into their midst as a theme for argument. They were to catch it in the air; play with it; bounce it; kick it; destroy it if they saw fit; tear it to pieces and leave it in shreds.

The theme proposed was: *That the present tendency towards informality in English gardening is likely to persist and is not in the nature of a passing fashion.*

I very quickly discovered that we were somewhat at cross-purposes. My assumptions were evidently on too grand a scale, an eighteenth-century scale, shall we say; and theirs were very naturally and rightly and contemporaneously, mid-twentieth century. Now that, as we have all had occasion to notice in other respects of life, makes a difference. I had been thinking in terms of gardens such as Stourhead, or West Wycombe, or Corsham; they were thinking in terms of housing estates,

institutions, municipal lay-outs, and the more modest type of private residence; I do not know whether to define it as a villa or a bungalow. Neither the acreage nor the architecture of their inward vision bore any resemblance to mine. It was with a sigh of regret that I hurriedly readjusted my ideas.

A sigh of regret, for it seemed to me a pity that creations such as Stourhead should be for ever a thing of the past. By the grace of God and the National Trust one could still go to look at them, decently and even imaginatively maintained; but their number was finite; never, now, to be added to. What enormous fun those planners must have had, both the owner and the landscape gardener in his employ! Let me for one moment, ignoring dates and facts, and the famous names familiar to us all—the WILLIAM KENTS, the LANCELOT BROWNS, the HUMPHREY REPTONS, and even that rather forgotten poet-gardener WILLIAM SHENSTONE—let me for one moment share their excitement, their exhilaration, as they bent over their plans and sketches on paper, spread out on a vast table in the library, making a correction here, an addition there, suddenly visualising something better . . . imagination rioting, with no ponderous considerations of labour or expense to burden the airborne fancy. And if it was exciting enough to point with one's pencil at a spot on the plan, how splendidly more exciting to go out next morning to the very spot and there direct your rabble of labourers, armed with axes, saws, beetle-wedges, picks, mattocks, spades, forks, and shovels, looking, I imagine, something like the peasant army of the French Revolution (only there was no revolution), all ready to carry out, instantly, your instructions.

> Joyful to see, as witless of their cause,
> Their much-loved lord his sylvan arts renew.

"That block of trees must fall," you said; and by the time you came back, having finished your wine, there was a clearance exposing a distant prospect of the countryside.

"Those cottages must be pulled down," you said. "They obstruct the view. Rebuild them out of sight." It was done. (If you do not believe this, I will quote to you the example of an entire village removed at Kedleston in Derbyshire, to get it out of the way. Even the late LORD CURZON OF KEDLESTON, magnificent survivor of the eighteenth century though he was, would scarcely have dared to issue so sweeping an order—much as he might have wished to.)

"That stream must be dammed," you said, using the word in its literal not its profane sense; and there, within a day or two, the plashy meadow had smoothed itself out into the reflecting mirror of a lake.

You were, in fact, the painter of a picture, working on the three-dimensional scope of nature's landscape, not on the the two-dimensional limitations of a flat canvas. CLAUDE LORRAIN and NICOLAS POUSSIN and SALVATOR ROSA could suggest lakes, temples, and blue distances; but you, the eighteenth-century English landowner, could create them at will, in a stereoscopic reality of living things. All appearance of artificiality must be swept away. Reaction is natural to the human mind; and men

had for long enough enjoyed the rigid angularity of French and Dutch taste, in balustraded terraces, gravelled walks drawn with the straightness of a ruler, box-edged parterres, and lines of avenues leading inflexibly to terminate in a pavilion or an obelisk. This was not Nature with a capital N; this was but artifice. And as the heroic couplet gradually faded out of poetry, so was the classic pavilion replaced by the rustic grotto, the gravelled walks by mossy winding paths, the terraces by grassy slopes; and the avenues deflected by judicious felling and planting, to melt and merge into the vaster garden of all England beyond.

So ambitious a conception inevitably led, as it grew wilder and more romantic, to certain absurdities on which we may dwell for a moment, although they have nothing to do with gardening proper. The ivy-mantled tower would doubtless attract the desirable owl, but it was improbable that any local hermit would voluntarily arrive to occupy the grotto or the Hermit's cave, so a hermit must be arranged for. Some garden-owners contented themselves with a stuffed figure, complete with book and hour-glass; but MR. CHARLES HAMILTON, of Pains Hill in Surrey, had the grander notion of engaging a live anchorite; he was to be supplied with a Bible, a mat for his feet, a hassock for his pillow, water to drink, and food from the house. In exchange for these comforts he must inhabit the hermit's cave for a period of seven years, during which time he must wear a camlet robe (whatever that may be), must never cut his hair, his beard, or his nails, and must never exchange a word with any of MR. HAMILTON'S servants.

Seven years proved too much for him; he was gone at the end of three weeks.

Then there was MR. TYERS, of Denbies, near Dorking, who conceived his garden as a symbol of human life, where the walks were "in some parts easy, smooth, and level, in others rugged and uneven," and suitably culminated in a Valley of the Shadow of Death, complete with coffins, and skulls strewn about.

We may smile at such fantasies, but there is no denying that the English landscape garden represented a major effort of the imagination applied to what I suppose we must acknowledge to be a minor art. For here was something quite new. It meant a complete and revolutionary breakaway from everything that had gone before. Even the French, who, I contend, have no sense of gardening as we English understand it—even the French, with their own magnificent sense of architectural design in gardens as in their cities, their long avenues, their vistas cut straight down to a wider view—even the French were affected by the English fashion and adopted it, calling it *le jardin anglais*. They appeared unaware that two of their own painters, CLAUDE and POUSSIN, had been among the first to inspire the new mode among the English.

What did it mean to them, the *jardin anglais*, the English garden? What does it mean to us, who are English with all our tradition of gardening behind us? I think it probably means a much more real thing to us than it could ever mean to the French, with their sense of

symmetry, balance, and intellectual control. The French mind is not adapted to wild romantic notions; it is a severe, logical mind; but just then it went romantic, with such poets as ALFRED DE VIGNY (1797–1863), ALFRED DE MUSSET (1810–1857), and VICTOR HUGO (1802–1885). It was as an expression of the *Zeit-geist*, the spirit of the age, that the French enthusiastically assimilated the conception of the *jardin anglais*.

It was not natural to them. I claim that it was natural to us, an inevitable development to which we must, sooner or later, have come. The Dutch and the French fashion had been imposed upon us, as it were, from the outside. With the advent of landscape gardening we found ourselves; we threw off artificiality; we found the idiom best suited to our national genius and to the setting into which our gardens were to be put. You have seen the photographs of Stourhead and West Wycombe, and I think you will agree that nothing could be in better harmony with the English countryside: there is no violent contrast between the man-made garden and the features of Nature beyond. They merge. (Figs. 88, 89.)

Yet at the same time it is no good pretending that a garden can ever be "natural." A garden is, of its very nature, a creation of man. The most that a gardener, even a landscape gardener, can do is to make his garden look as though it had occurred accidentally—conveniently in the right place, which happens to be associated with his dwelling-house—of its own accord. That assumption is, of course, just plumb nonsense. We all know that gardens do not happen of their own accord. We know, on the contrary, that they take a great deal of planning and an enormous lot of thought and an even more enormous expenditure in upkeep. To talk about wild and natural gardening is just sheer rubbish. There is no such thing.

I shall hope presently to show you some slides which may suggest a happy effect of apparently "natural" gardening, although it is, in fact, very carefully thought out. Before putting these on the screen, however, I would like to suggest to you that the aesthetic appreciation of beauty in Nature is a highly sophisticated taste. Children and uneducated persons are lacking in it, beyond perhaps a vague feeling of satisfaction at the sight of a rainbow, a cascading river, or a particularly dramatic sunset. Generally speaking, the unsophisticated taste in gardening is more likely to be aroused by this kind of thing (two slides of herbaceous borders, Littlecote), or this (Viola border at Trent). I am not decrying the beauty of the Littlecote borders, which are as fine specimens of their kind as you could wish to see, nor of the chequerboard ingenuity of the Viola border at Trent,* but I do suggest that a certain crudity of colouring provokes an easy admiration of the obvious, which may be denied to the subtler charms of other kinds of gardening.

That this is peculiarly true of the taste for the picturesque in landscape gardening, is emphasized by the very derivation of the word picturesque, from the Italian *pittoresco*, "after the manner of painters." This is not intended to suggest that an untrained eye might not derive

* See *J.R.H.S.* **75**, fig. 203.

great pleasure from a painting of a romantic landscape, such as we were privileged to see in quantities at the winter exhibition at Burlington House a year or so ago, but it must be remembered that they (the untutored) have now been shown the way how to look at such paintings and to associate them with the so-called picturesque manner of gardening which they inspired. These things have to be learnt. There was a time when a ruin in the foreground would be considered an untidy object, to be removed as speedily as possible; and as for a dead tree, it would be regarded as a disgrace to the gardener or the forester who suffered it to remain; but the time came when, instructed by the romantic painters, English landowners began frantically to construct sham ruins in their gardens, and deliberately to plant a dead, brown tree where the supposedly "natural" landscape appeared to demand it.

To speak of landscape gardening as "natural" is thus an utter fallacy. It was highly self-conscious, though not the less beautiful for that.

And out of this acquired taste for the picturesque—this cult of the seemingly natural—arose, I think, the present-day tendency towards informality to which I referred at the beginning of this lecture. There are, of course, cogent other reasons for its popularity. They are so manifest as scarcely to be worth pointing out. They can be put into two words: labour, and expense. No longer can any of us behave in the high-handed manner of LADY HESTER STANHOPE who, desirous of improving the garden at Walmer Castle, got "I know not how, all the regiments that were in quarters at Dover, and employed them in levelling, fetching turf, transplanting shrubs, flowers, etc. . . . A few civil words, and occasionally a present, made the work go on rapidly."

No doubt it did; and no doubt there are several members in this audience who would be quite glad of a few regiments to level, fetch turf, and transplant, all in return for a few civil words and an occasional present.

Not for us are those exquisitely kept gardens, involving, if not a regiment, at least a platoon of workers. Look at this photograph (grass steps at St. Catherine's Court) and think for a moment what those steps entail in cutting and edging; or at this photograph (Lavender and topiary at St. Catherine's Court), with those perfectly trimmed Yew trees. (I happen to know that at St. Catherine's Court they are obliged to borrow the local fire-escape annually, to reach the top of their Yews). And what shall be said of Hutton John (slide of Hutton John)—what shall be said, indeed, except that one's sympathy goes out to the owner of such a garden, in his responsibility of keeping it up.

And yet another factor has influenced us more than we may realize. It is the enormous increase in the number of flowering shrubs and trees at our disposal. Our great-grandfathers had their Azaleas, their Rhododendrons, their Magnolias, their Kalmias, and made good use of them, but think of the introductions, both species and hybrids, of only the last fifty years! If an old gardener who had died in say 1900 could return to-day, he would be puzzled to name half the things he would see growing in our gardens.

These beautiful importations, these exciting and proliferating hybrids, represent not only an immense saving of labour and maintenance, but of their very character they demand an informal treatment. It is impossible to imagine them in conjunction with the Victorian system of bedding out—I hope a thing of the past in private gardens. (Would that it were a thing of the past in public gardens also.) We poverty-stricken and over-taxed moderns have been remarkably fortunate in that this sudden flood of relatively care-free plants should have coincided with our necessity for economy. It seems to me—and this is perhaps what I was trying to impress on my young friends at Wye College—that English gardening may be entering upon a new phase, which is really only a development and destined outcome of the now time-honoured tradition of what used to be called landscape gardening with its romantic outlines. I see signs, which I welcome, of a rougher and untidier way of treating plants. Let me say, for example, that we are no longer instructed to prune our hybrid Tea Roses to within an inch of the ground: we let them grow up into tall bushes. Let me point out also that we have now taken to the idea of growing certain sorts of Roses as shrubs. The hybrid Musks for example: we let them ramp away; we do not hack at them with the knife or secateurs. They would lose all their character if we did.

A judicious (and most convenient) appearance of neglect is therefore what we may look forward to seeing. I take comfort in the belief that both MR. WILLIAM ROBINSON and MISS GERTRUDE JEKYLL would approve. I wish I had time to expound certain other theories of gardening, to which I hold very strongly and which could only be supplementary to what I have been saying to-day; but one must not confuse one's propositions, so I will end up with a bunch of photographs illustrating, I hope, the arguments I have been using.

The first slide (Hidcote) is intended to show you one view of what I consider to be one of the most lovely gardens in England. It is a modern garden, by which I mean that it has been created by one man, MAJOR LAWRENCE JOHNSTON, within the last forty years. You will observe the clever combination of formality and informality: he has got the best out of everything—the mown grass, the long vista up to the end, and the best out of his generous planting of Lilac (should I say Syringa?) and Iris sprawling towards the path. (Figs. 91, 92, 93, 95.)

I cannot show you more than one slide of this garden, but if you want to see a twentieth-century garden at its best, do make a point of visiting Hidcote, this spring, summer, or autumn.

My next slides are of less carefully designed gardens. They are more in accordance with "natural" gardening, although you will realize that it has all been very carefully and deliberately thought out. These do bear out my contention that landscape gardening is still a live form of gardening in England.

Do these not remind you of the photographs of Stourhead and West Wycombe? It is all in the same tradition, travelling away from the knot-garden of Tudor and Stuart times; away from the French and Dutch influences; back to what was really the sort of gardening that we English prefer: the sort of gardening that we shall persist in calling wild and natural.

SHOW PIECES FOR DISCERNING GARDENERS

H. H. Thomas, V.M.H.

EVERY gardener is a showman at heart and his sense of showmanship is gratified in ways that are determined by personal preferences. Some find pleasure in massed groups of summer bedding plants, providing a brilliant and prolonged if monotonous show of bloom, yet those who follow a more adventurous course that may lead to failures and disappointments, or to triumphs that bring unwonted thrills, will find other plants which are perhaps worthier of their care. These can be grown at less expense since their appeal depends not on the splendour of a crowded assembly but on the charm of the individual. They have an ephemeral beauty compared with that of the bedding plants but they grow big, they flower freely, are lovely while they last, and thus should satisfy the needs of the discerning gardener who likes to have a show. I have found them among the shrubs which are not hardy except in the milder parts of these islands. That may be a wayward choice for a garden in a somewhat bleak district of Buckinghamshire where much of the land is light, calcareous and abounding in flints that vary in size from that of one's fist to a bantam's egg. The most economical way of gardening is to cultivate plants that are suited to the soil and locality, yet gardeners were ever perverse, trying, as they do, to make a success of those that need a kindlier climate than local conditions afford. As it was certain that such shrubs would not flourish in the open garden they were planted in borders by the house walls where they find protection from severe frost and shelter from the violent winds which often prevail. Some of them have prospered and grown into modest show pieces that delight the eye and warm the heart of folk who take pleasure in experimental gardening. How precious are these sheltered borders yet how often filled with plants that would be happier in the open garden.

One of the shrubs admirably suited to such a position is *Carpenteria californica*. The plant shown in the illustration is in a border at the foot of the house wall facing west and there it has long survived the trials and vicissitudes of our inconstant climate. (Fig. 97.) Its leaves are seared during cold weather and it suffered considerable damage in the hard winter of 1946–7, but it has recovered and now shows no sign of the ordeal through which it passed. I do not know how long this beautiful shrub may be expected to flourish. In *Trees and Shrubs Hardy in the British Isles*, BEAN states that "it may not be naturally a very long-lived plant" but my specimen which was planted 15 years ago shows no sign of deterioration. It is now about 7 feet high and 12 feet wide and what a heartening sight it is in late June and early July; its white flowers, each one 2 to 2½ inches across, with boss of stamens and prominent style for centre, are slightly fragrant.

It was thought that a plantation of tree heaths would assure a few ideal show pieces in spring and three of them that would have had no chance of survival in the open garden were planted in one of the sunny borders by the house walls. They were *Erica australis*, *E. lusitanica* and

E. arborea. Alas! *E. australis*, with rose-red flowers, most colourful of the tree heaths, and *E. lusitanica* proved tender even in this sheltered spot and perished during a hard winter. *E. lusitanica* was least resistant to severe cold and the first to be lost. *E. australis* survived for a time but in 1947 was damaged so badly that it did not recover. *E. arborea* lived for many years and grew into a tall, lax and eventually rather a gaunt bush; when its white, scented flowers, beloved of the bees, were out in April, its choice as a promising show piece was justified. *E. arborea* var. *alpina*, less tall, of upright and more compact growth, is much hardier than the species; in a position in the open, among other shrubs, it has suffered no harm during many inclement periods. Its plumose branches, leafy in a lively green, bear their white flowers freely in April-May.

One of the shrubby Speedwells from New Zealand, *Veronica salicifolia*, though not safe in the open, appears to be a good deal hardier than *V. speciosa* and its varieties which are so successful in mild maritime districts. These failed even in the cosiest corner, yet within the shelter afforded by the house wall facing south-east, *V. salicifolia* grows 5 feet or so tall and is massed with bloom in July. Its 6-inch long racemes, closely set with small, white, lilac-tinged flowers, stand out conspicuously among the evergreen, willow-like leaves; so profusely are they borne as to give this shrub a high place among our smaller show pieces.

The Chilean Potato flower, *Solanum crispum*, made such remarkable progress as to flatter its caretaker—the astonished gardener who had done so little for it. In the course of a year or two it clambered over the south-east porch and grew so exuberantly as to cover part of the house wall. (Fig. 96.) Despite, or possibly because of, the severe pruning practised each spring to try to keep it within reasonable bounds, it continued to make such rampant growth that eventually it was thought wise to supplant it by something of less embarrassing vigour. Yet it was a cheerful and engaging show piece when massed with its large corymbs of deep mauve or purple, yellow-eyed, potato-like flowers. It seems that this was a fortunate dip into the gardener's lucky bag for *S. crispum* var. *autumnale* which was planted against the house wall facing south four years ago is scarcely bigger now than when it was put in. Perhaps the variety is more temperamental than the species.

As successor to the solanum the choice fell on *Coronilla glauca*, a leguminous shrub with persistent, glaucous leaves and bearing fragrant yellow flowers in spring. It is an attractive plant that in time may attain to the dignity of a show piece but its planting was regarded as a venturesome experiment. So far it has passed safely through the winters and has flowered moderately though still only about 4 feet high. *Choisya ternata*, unsafe here in the open, was thought worthy of a sheltered spot; there it grew into a plant 5 or 6 feet high in very few years. It has lustrous, aromatic leaves and its white, scented flowers, most profuse in May, appear intermittently throughout the summer months. It is very susceptible to damage by snow; there is an aftermath of broken shoots and branches following even a moderate snowfall. They are scarcely less brittle than those of the most brittle of all shrubs, *Robinia hispida*; because of this pronounced failing we now grow the Robinia against a

wall and when the large, rose-coloured, Pea-shaped flowers are out it is not unworthy of such a precious site.

Clematis Armandii drapes the garden wall with long, slender shoots clothed with shining evergreen leaves which form a perfect background for the white and slightly fragrant flowers in April. If in time it covers too large an area of wall it may be pruned hard after flowering is over. It grows quickly and in a few years will be as fine as ever again and better furnished with leafy shoots near the base.

Abutilon vitifolium has been grown from time to time in a sunny sheltered corner by the house but it has not lived long enough to make a show piece. The large leaves and pale mauve or pale violet flowers, so unusual a colour among shrubs, make it a noteworthy plant. Fortunately it is easily raised from seeds sown under glass in spring; if the seedlings are grown in 5-inch pots they will be well developed plants by the following April and may then be set out of doors. Another Abutilon, *A. megapotamicum*, bears flowers of gay and bizarre appearance, suggestive of a ballet dancer gowned in red bodice and yellow skirt; we have been unable to find a position snug enough to assure the survival of the plant for more than a year or two. Another little show piece is provided by *Pieris Forrestii* which grows in the border by the house wall facing west. The racemes of white flowers in April, in company with the freshly opening leaves, so brilliantly coloured that they may be described faithfully as scarlet, make this a shrub of charm and distinction.

A few Camellias are growing up and if all goes well no doubt in time they too will be numbered among the show pieces. They seem to bloom most freely in the sunny places though there, unless the roots are kept moist by a mulch of compost or manure in early summer, the leaves lack the lustre that distinguishes others in the shade.

In the borders by the house the soil consists largely of peat; there is no trace of lime. The plants described thrive in it though soil of this kind is certainly not essential to the well-being of all of them.

There are hardy plants suitable for cultivation in the open garden that will grow into show pieces with little or no attention on the part of the gardener. One of them, *Lonicera etrusca*, has reached the top of a derelict Apple tree some 20 feet high, endowing it with fresh, exotic comeliness and possibly assuring it of an extended lease of life, for the tree depends scarcely less on the thick, twining stems of the Honeysuckle for support than on its own enfeebled roots. This climbing plant drapes the ancient tree with a close curtain of leafy shoots which in July are laden with yellow flowers so deliciously scented as to give notice of their presence long before the plant is seen.

Another show piece, hardly less striking, though less spectacular than most of those described, is a Juniper, *Juniperus Sabina* var. *tamariscifolia*, which was put in as a small plant 14 years ago and now measures about 7 yards across and 20 yards in circumference, yet it is not more than 5 feet tall at its highest point. The tabulated branches, arranged in layers, are flattened as though the shrub were growing on a windswept plateau instead of in the comparative shelter of a lowland garden. Through winter and summer alike it is a picturesque and in its way an impressive sight, commanding respect and compelling a tribute

of admiration which is tempered by some disquiet at its triumphant progress. When it was put in the neighbouring shrubs appeared to be at a safe distance but it has engulfed one after another and still marches on. The Strawberry tree, *Arbutus Unedo*, might be regarded as a show piece when, in October, the drooping panicles of white flowers and the ripening orange-red fruits, bearing a superficial resemblance to strawberries, are conspicuous among the evergreen leaves. It was planted in the open garden and has suffered no injury except in 1947 when several branches were killed. It is one of a limited number of ericaceous plants that will thrive in soil containing lime.

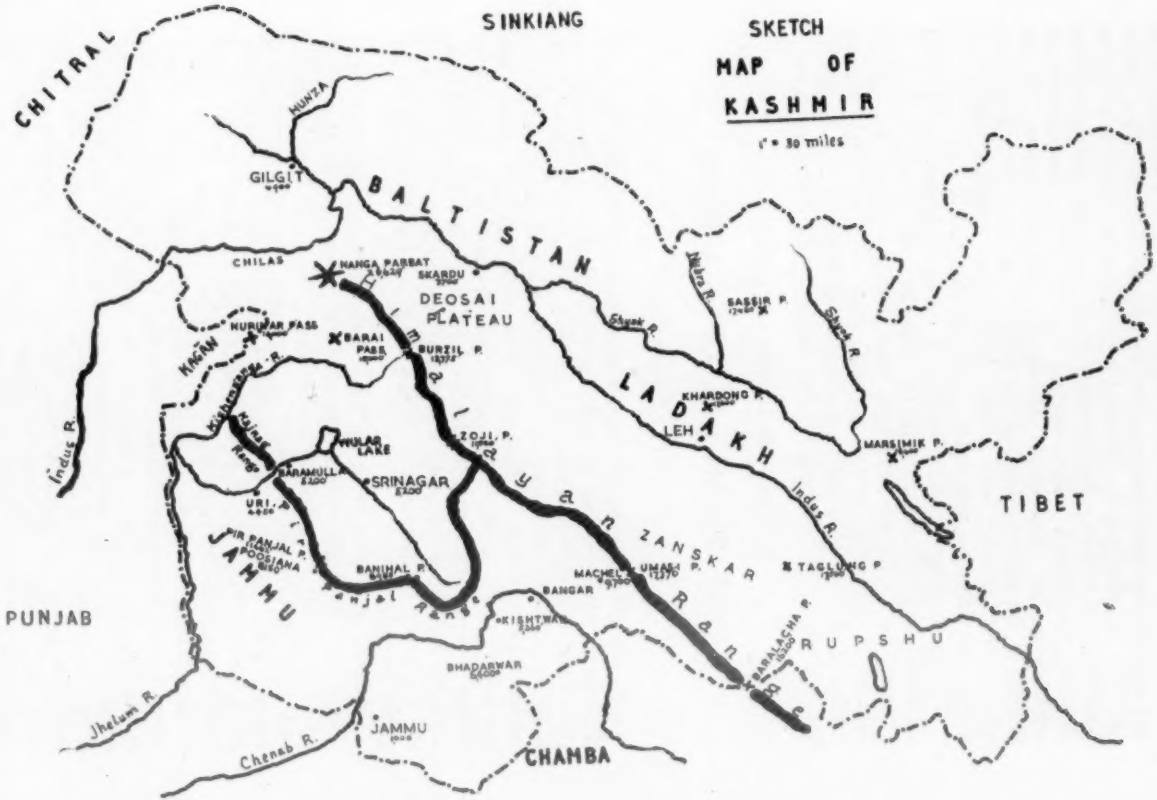
Elaeagnus pungens var. *maculata* (var. *aureo-variegata*), the finest of all shrubs with variegated leaves, is worthy to rank as a show piece, at all events during the winter months when its leaves, so gay in green and gold, strike a cheerful note on the dullest days; when the fitful sunshine reaches them they glow with a brilliance unmatched at that season by any other shrub that depends for its decorative value on leaves alone.

THE PRIMULAS OF KASHMIR

F. Ludlow

IN the years before the war MAJOR SHERRIFF and I lived in Kashmir, whence, with Srinagar as ourb ase, we used to set out annually on plant-hunting expeditions into the Himalaya. Some of these journeys took us far afield into Bhutan and Tibet,whilst others of a less ambitious nature were confined to Kashmir. Our collecting has never been specialized, and in the 2,000 gatherings (preserved in the British Museum (Natural History)) which we have made in Kashmir we have, I think, amassed a tolerably representative collection of the flora of the country. In this paper I shall confine my remarks solely to the genus Primula.

Fifteen species of Primula have hitherto been recorded from Kashmir, all of which, with the exceptions of *P. erosa* and *P. rotundifolia* we have studied and collected in the field. These two latter Primulas may possibly have been reported in error as no herbarium specimens are available. In addition to these fifteen species, three other Primulas, *P. Duthieana*, *P. Reidii*, and *P. obtusifolia*, are recorded in this paper from Kashmir for the first time. I do not pretend that this catalogue of the species is complete, for there are parts of Kashmir which neither MAJOR SHERRIFF nor I have visited, and which have never been explored botanically. For instance, I have seen no material from the Kaj Nag range nor from many areas on the southern slopes of the Pir Panjal. It is a noteworthy fact that there is no representative of the large Petiolares section in Kashmir, though this group of Primulas extends from S.W. China to the State's southern frontier. But *P. sessilis* has been found in Chamba, and it would not be surprising if this Petiolarid was one day discovered in the Kishtawar or Bhadarwar districts of Kashmir. Then, in Trans-Himalayan Kashmir, we have visited, but


SKETCH
MAP OF
KASHMIR
1" = 30 miles
SINKIANG
CHITRAL
HUNZA
GILGIT
BALTISTAN
CHILAS
NANGA PARBAT
SKARDU
DEOSAI PLATEAU
Indus R.
Shyok R.
SASSIR P.
NURIMAR PASS
KAGAN
BARAI PASS
BURZIL P.
KISHENGANGA R.
KHARDONG P.
LADAKH
LEH
ZOJI P.
WULAR LAKE
BARAMULLA
SRINAGAR
MARSIMIK P.
TIBET
Indus R.
URI
PIR PANJAL P.
POONCH
RAJOURI
JAMMU
Pir Panjal Range
BANIHAL P.
Great Himalayan Range
ZANSKAR Range
MACHEIL
UMASI P.
TAGLUNG P.
BANGAR
KISHTWAR
RUPSHU
BHADARWAR
PUNJAB
Jhelum R.
JAMMU
Chenab R.
CHAMBA

KEY TO THE PRIMULAS OF KASHMIR

1 Flowers yellow
- leaves lanceolate; farinose . . . . . *P. Duthieana* 9
- leaves elliptic or ovate; efarinose . . . . . *P. floribunda* 16

2 Flowers white
- leaves hairy; flowers sessile . . . . . *P. Reidii* 17
- leaves glabrous; flowers pedicellate . . . . . *P. involucrata* 5

3 Flowers pink or rose-pink
- leaves round or reniform . . . . . *P. Clarkei* 1
- leaves ovate, obovate or elliptic
  - flowers precocious (except in var. *elegans*); capsule globose, included calyx . . . . . *P. rosea* 6
  - flowers coaetaneous; capsule cylindric, longer than calyx . . . . . *P. sibirica* 8

4 Flowers purple, blue purple, Lilac, or mauve
- plants caespitose or creeping; scape (at time of flowering) less than 2 cm. long
  - leaves efarinose . . . . . *P. reptans* 15
  - leaves farinose . . . . . *P. minutissima* 14
- plants rosulate; scape (at time of flowering) more than 2 cm. long
  - plants efarinose
    - leaves sharply serrate, erose; or erose-denticulate
      - umbel loose, flowers few . . . . . *P. elliptica* 2
      - umbel compact, flowers many . . . . . *P. erosa* 13
    - leaves entire, sometimes faintly crenulate, or obscurely denticulate
      - leaves lanceolate . . . . . *P. macrophylla* 10
      - leaves ovate . . . . . *P. involucrata* 5
  - plants farinose
    - flowers sessile, or subsessile, or on short pedicels; inflorescence compact and spherical
      - scape robust; basal scales present . . . . . *P. denticulata* 12
      - scape slender; basal scales absent . . . . . *P. Schlagintweitiana* 7
    - flowers with long pedicels; inflorescence lax or open
      - leaves lanceolate or strap-shaped
        - farina white . . . . . *P. macrophylla* 10
        - farina yellow . . . . . *P. Inayatii* 4
      - leaves obovate or oblong
        - scape less than 10 cm.; corolla lobes emarginate . . . . . *P. hazarica* 3
        - scape more than 10 cm.; corolla lobes entire . . . . . *P. obtusifolia* 11
      - leaves orbicular or reniform . . . . . *P. rotundifolia* 18

never collected in, Hunza, Gilgit, and Astor, and it is highly probable that certain Chitral Primulas will one day be found in these districts. There may even be a new species lurking in some distant valley, for Kashmir is vast and difficult to work, and Primulas can be very particular in their habitats.

The rainfall in the State differs markedly in various localities. Along the southern face of the Pir Panjal Range, which protects the beautiful vale of Kashmir from the fierce heat of the Punjab plains, the annual rainfall varies from 40 inches at Jammu to 60 inches at Poonch, the bulk of this precipitation occurring during the monsoon months of July, August, and September. In the valley of Kashmir, however, which lies north of the Pir Panjal Range, the rainfall varies from 25 inches at Srinagar, the capital, to 40 inches at Kulgam, and the greater part falls in winter and spring. The effect of the monsoon in the actual valley of Kashmir is, therefore, very small indeed as the Pir Panjal Range acts as a powerful rain-screen. Still further north, beyond the great Himalayan Range, the rain-shadowing effect of the Himalaya is even more marked, and precipitation is almost negligible save in the form of snow at great heights. At Leh, the capital of Ladak, the average annual rainfall is not more than 3 inches, whilst at Gilgit it is barely 5 inches. Consequently, the mountain ranges of Trans-Himalayan Kashmir are bare and barren and harbour few plants of garden merit. But in the valley of Kashmir with its wet winters and dry summers, climatic conditions approximate more closely to those of the British Isles than any other part of the Himalaya, so that most of Kashmir's loveliest plants are hardy and quite easy to cultivate in Britain.

Eight out of the eighteen species of Primula dealt with in this paper belong to the Farinosae section. Next in order comes the Nivales section with three representatives, then the Minutissimae and Denticulata sections with two species each, and finally the Rotundifolia, Soldanelloides, and Floribundae sections each with a single representative.

Some of these species have an extraordinary limited distribution. *P. Clarkei*, for example, is still only known from the village of Poosiana on the old Moghul route via the Pir Panjal pass into Kashmir, where CLARKE originally discovered it in 1876. Then, again, *P. Inayatii* and *P. hazarica* have only been found on the extreme western frontier of Kashmir, and the adjoining district of Hazara in the North-West Frontier Province, whilst the distribution of *P. Duthieana* is almost equally restricted.

Kashmir, like so many other parts of the Himalaya where the population is rapidly increasing suffers from erosion caused by the "laissez-faire" cultivation of mountain slopes, over-grazing, and the destruction of forest growth by fire and axe. Vast flocks of goats and herds of cattle ascend annually from the Punjab plains, and spread like locusts every summer over the face of this fair and pleasant land. In certain areas one may walk for mile upon mile in the alpine zone and see nothing but a few stunted shrubs and close-cropped herbs, and those who would view the Kashmir flora in all its former glory and

splendour must now seek it in game sanctuaries and reserved forest areas. It is imperative that more effective conservation measures be taken if the disastrous floods of recent years are not to be repeated.

The key which follows is entirely artificial, but will serve, I hope, to identify any Kashmir Primula.

I have frequently consulted the following works in the compilation of this paper.

The Genus Primula. W. Wright Smith and H. R. Fletcher.
Beautiful Flowers of Kashmir. E. Blatter.
Wild Flowers of Kashmir. B. O. Coventry.
Flora of British India. J. D. Hooker.

Several of the illustrations accompanying this paper have been kindly loaned by the Royal Botanic Garden, Edinburgh. I am much indebted to MAJOR G. SHERRIFF for the accompanying sketch map (p. 192).

FARINOSAE SECTION

1 *Primula Clarkei* Watt

This remarkable plant was discovered by CLARKE in 1876 near the village of Poosiana (7,000 feet) at the southern foot of the Pir Panjal Pass on the old Moghul route into Kashmir. This remained the only known record until 1933 when it was rediscovered, again at Poosiana, through the instrumentality of MR. B. O. COVENTRY, Chief Conservator of Forests, Kashmir, and his Deputy Conservator, MR. AMIN CHAND. Further search will doubtless reveal the presence of this plant elsewhere on the southern slopes of the Pir Panjal, though in the summer of 1943 I sought for it in vain in the district of Kishtawar, and my sole acquaintance with this Primula is confined to a single gathering of a few non-flowering specimens from the type locality in 1937. Even to-day Poosiana remains the only known locality in which this plant is known to exist in the wild state.

P. Clarkei blooms in early spring and its scape, though usually obsolete, is sometimes well developed and bears 3–4 flowers of a lovely pinkish hue. The plant is both efarinose and glabrous, and carries a number of thin membranous leaves which may be orbicular, reniform, or cordate, with dentate or serrate margins. (Fig. 98.)

P. Clarkei was introduced into Britain from seed and sent by the Kashmir Forest Department in 1935. It can be raised with comparative ease by division. Its taxonomic position has long been a puzzle to botanists. PAX originally placed it in the Sinenses section, whence at a later date it was transferred to the Rotundifolia section because of the shape of its leaves. Next it was incorporated in the Petiolares section by WRIGHT SMITH and FORREST from which it was transferred to the Farinosae with *P. elliptica* and *P. rosea* as its nearest relatives, and in this very accommodating section where so many strange Primulas have found asylum, let us hope it will remain undisturbed.

We have a single gathering only :—34, Poosiana, Pir Panjal Range, 7,000 feet, "Damp rock faces," 31.7.37.

P. Clarkei is figured in the *Botanical Magazine*, Vol. 165, New Series, Tab. 17.

2 *Primula elliptica* Royle

Originally discovered by ROYLE in Kashmir in 1831, this Primula has since been found in various parts of the Himalaya from Hazara to Kumaon. It is particularly abundant in Kashmir south of the main Himalayan Range at various elevations between 10,000–14,000 feet on moist hill slopes and moss-covered rocks. It is closely related to *P. rosea* but normally flowers at a later date. It is just as easy to raise from seed as *P. rosea* and is well worth a place in the rock garden, although it is not such a striking plant as the latter. The loose umbel of 3–6 purplish blue or violet flowers is borne on a scape which may attain a length of 9 inches. The plant is devoid of farina. The shape of the leaves gives this Primula its specific epithet. (Fig. 102.)

We have the following gatherings :—

14 Ahlan Valley, 12,000 feet, 9.7.37; 107 Mantnar Valley, 12,000 feet, 20.6.39; 7861 Haramukh, 13,000 feet, 29.7.40 ; 7934 Thajwas, 13,500 feet, 4.8.40; 8026 Zoji La, 12,500–14,000 feet, 26.8.40; 8715 Mantnar Valley, 11,000–13,000 feet, 5.9.40 ; 8215 Mantnar Valley, 13,500 feet, 11.9.40; 9173 Barnaj Valley, Kishtawar, 11,000 feet, 10.7 43; 9319 Rajparyan Sanctuary, 12,500 feet, 17.8.43, and several gatherings from the Simla Hill States.

3 *Primula hazarica* Duthie

This Primula was first discovered by DUTHIE'S collector, INAYAT KHAN, in the Kagān and Serān valleys in the Hazara district of the North West Frontier Province in 1899. DUTHIE also mentions gatherings from Western Kashmir but omits localities, and BLATTER is almost equally vague. *P. hazarica* grows in the crevices of rocks and under the shelter of boulders. The leaves are covered with farina and are obovate. The mauve-purple flowers are borne on slender scapes which may vary in length from 1–4 inches. (Fig. 101.) Plants which were raised from seed which we sent to the Royal Botanic Garden, Edinburgh in 1935 flowered in the three succeeding years, and were then lost to cultivation. *P. hazarica* derives its name from the district whence it was first obtained. It is akin to *P. Jaffreyana* from S.E. Tibet, and like that Primula becomes quite brittle and dry in winter. In this dormant state *P. Jaffreyana* can be kept for many weeks and despatched to the most distant countries, and in all probability the transportation of *P. hazarica* in this state would prove equally successful. A description of this plant in the field together with a habitat photograph is given by HOLDSWORTH in the *Journal of the Alpine Garden Society* (VIII. p. 22).

We have a single gathering:—1467 Barai Valley, 12,000 feet. "Growing in clefts of rocks in damp situations," 25.7.35.

4 *Primula Inayatii* Duthie

BLATTER does not record this Primula but it occurs a few miles below Uri on the Jhelum Valley road where it grows in abundance on an almost vertical cliff-face in the constant splash of a cascade. This is another of INAYAT KHAN'S discoveries in the Hazara district of the

North-West Frontier Province, and seems confined to this area, and the extreme western frontier of Kashmir.

It flourishes at low levels between 3,000–5,500 feet and blooms in Kashmir in winter and early spring, *i.e.*, January to March. The leaves are strap-shaped, with red petioles, and are abundantly covered with yellow farina, and are distinguished by the fact that they continue to elongate during the fruiting stage, when they may attain a length of 10–12 inches.

The flowers, which are lilac with a yellow eye, are borne on a red scape which also continues to lengthen until the seed is set when it may be as long as 10 inches.

P. Inayatii can be raised without much difficulty from seed and is well worth a place in the garden, not only because of its intrinsic beauty, but also because it is one of the earliest harbingers of spring. Provided the drainage is perfect it will thrive with its roots in water, but it grows almost equally well (at any rate in Srinagar gardens) in drier situations such as moist shady banks.

P. Inayatii has been included by many authors in the Nivales section, and by STAPF in the Denticulata section. More recently it has been placed by WRIGHT SMITH and FLETCHER amongst the Farinosae where it seems happier than elsewhere. The specific name is in honour of DUTHIE's head collector who discovered so many lovely plants in the Western Himalaya.

We have a single gathering:—8298 Uri, Jhelum Valley, 4,000 feet, 24.1.41.

P. Inayatii is figured in the *Botanical Magazine*, Vol. 151, Tab. 9107.

5 *Primula involucrata* Wallich

This is one of the most widely-spread Primulas in the Himalaya and occurs from Kashmir to S.E. Tibet at altitudes varying from 10,000–14,000 feet. It grows in moist situations such as marshy meadows and along the banks of streams, whilst in the Rajparyan Game Sanctuary I found it associated with *P. Reidii* on moist rocks—the two white-flowered Kashmir Primulas together, a most pleasing combination. Its nearest relative is undoubtedly *P. yargongensis* from S.W. China and S.E. Tibet, from which it is apparently distinguishable on cytological grounds, but from my experience of these two supposed species in the field and herbarium, I find myself unable to differentiate them.

P. involucrata, it is true, is normally white, whilst *P. yargongensis* is generally mauve or rosy-red; but even in Kashmir mauve flowers occur quite frequently amongst the white, and pure white forms occur in S.E. Tibet alongside the rosy-red, and the most one can say of the flowers of these two plants is that they are generally white in the west, and usually red in the east. According to BRUNN, however, there is a definite cytological difference between the two (*P. involucrata* 2 N = 44, *P. yargongensis* 2 N = 20) and on this account they are, perhaps, best kept apart. Another close relative is *P. sibirica*, but *P. involucrata* is a larger plant in all particulars. It derives its name from the elongate

bracts which form a kind of involucre. It is devoid of farina, and easy to cultivate either from seed, or by division.

The species is represented in our collection by the following:—

190 Sinthan Pass, 12,000 feet, 6.7.39. "Damp ground near a waterfall. Corolla white, sometimes pink, and sometimes of an intermediate shade"; 7883 Zaiwan, 11,500 feet, 1.8.40; "Flowers white occasionally tinged pink"; 9133, Barnaj Valley, Kishtawar, 10,000 feet, 7.7.43; and many gatherings from the Simla Hill States and eastern Himalaya.

6 *Primula rosea* Royle

There are some Primulas that are never really happy until they can grow so close together as to exclude almost every other type of plant. This characteristic is perhaps more noticeable in the eastern Himalaya where certain species, especially those belonging to the Sikkimensis and Nivales sections, literally cover acre upon acre of upland pastures. *P. rosea* affords a fairly good example of this in the western Himalaya, for here and there in the alpine zone in Kashmir one frequently encounters great stretches of this exquisite Primula blooming near the melting snow, and, indeed, sometimes actually thrusting its scapes through the snow itself. Though other Primulas may vie with *P. rosea* in sheer loveliness and beauty surely none can surpass the glory of its rose-red blooms outlined against the white background of the virgin snow.

P. rosea is found from Garhwal westwards to Kashmir and Afghanistan at altitudes varying from 8,500–13,000 feet. Its flowers appear immediately the sodden ground is laid bare by the melting snow, but the leaves do not normally mature until the flowers are almost over or the fruiting stage begins. At the hill station of Gulmarg, however, there is a variety which has been distinguished as *P. rosea* var. *elegans* in which flowers and leaves are coaetaneous. *P. rosea* is easily grown in this country where moisture is abundant and the drainage perfect. A number of different forms have been produced by the horticulturist. Its nearest ally seems to be *P. elliptica* and the two may sometimes be seen growing in close proximity to each other. The specific epithet, of course, refers to the colour of the flowers which is a very perfect and pure rose-pink.

We have the following gatherings:—

43 Mantnar Valley, 10,500 feet, 28.5.39, "open grassy slopes"; 8129 Mohanmarg, Sind Valley, 10,000 feet, 7.6.40; "Ground left bare by melting snow"; 9204 Dudheri Pass, Kishtawar, 11,500 feet, 22.7.43, "Marshy land."

This Primula is figured in the *Botanical Magazine*, Vol. 105, Tab. 6437.

7 *Primula Schlagintweitiana* Pax

This Primula is locally abundant in Ladak, Baltistan, Hunza, the Karakorams, and other areas in Trans-Himalayan Kashmir, and is also reported from the Himalaya as far east as Kumaon. It resembles

Photo, G. Leslie Horn

WILD AND NATURAL GARDENING

FIGS. 88, 89—The Gardens at Stourhead House, Wiltshire (See p. 185)

Photo, Country Life

Photo, Country Life

WILD AND NATURAL GARDENING

FIG. 90—Primroses and Polyanthus at Sissinghurst Castle, Kent

FIG. 91—The Gardens at Hidcote Manor, Gloucestershire (See p. 187)

Photo, The Times

Photo, National Trust

WILD AND NATURAL GARDENING

FIG. 92—A side-path at Hidcote Manor (See p. 187)

Photo, Leslie P. Thompson, The Field

WILD AND NATURAL GARDENING

FIG. 93—The Lily pond and Lilac at Hidcote Manor (See p. 187)

Photo, G. Leslie Horn

FIG. 94—The Gardens at Stourhead House

Photo, National Trust

WILD AND NATURAL GARDENING

FIG. 95—The enclosure to the south of the Manor House, Hidcote (See p. 187)

Photo, H. H. Thomas

FIG. 96—*Solanum crispum* (See p. 189)

Photo, W. Abbing

SHOW PIECES FOR DISCERNING GARDENERS

FIG. 97—*Carpenteria californica* (See p. 188)

Photo, Royal Botanic Garden, Edinburgh

FIG. 98—*Primula Clarkei* (See p. 195)

THE PRIMULAS OF KASHMIR

Photo, F. Ludlow

FIG. 99—*Primula Duthieana* (See p. 200)

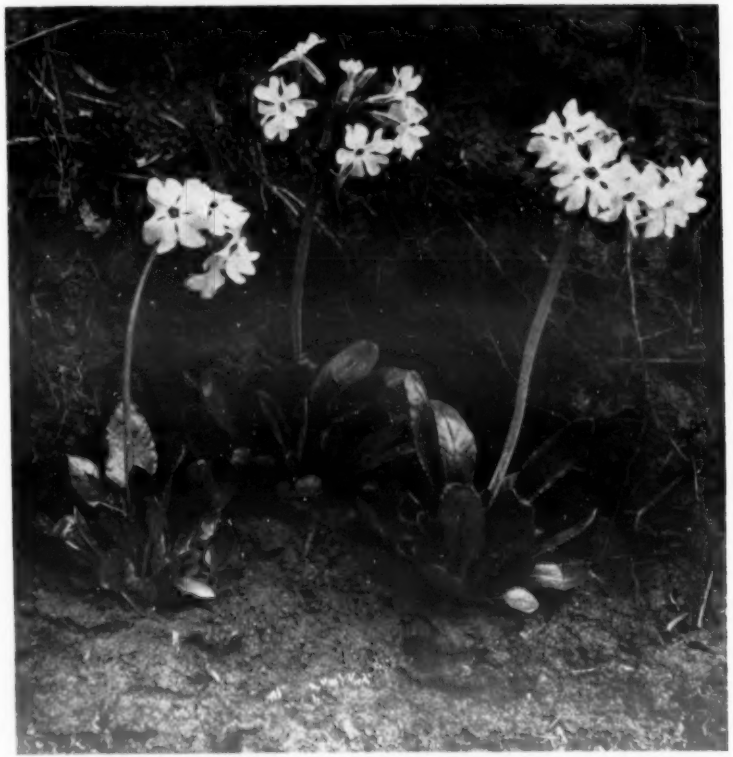
FIG. 100—*Primula Reidii* (See p. 206)

THE PRIMULAS OF KASHMIR

Photos, Royal Botanic Garden, Edinburgh

FIG. 101—*Primula hazarica* (See p. 196)

Photo, F. Ludlow



Photo, Royal Botanic Garden, Edinburgh

THE PRIMULAS OF KASHMIR

FIG. 102—*Primula elliptica* (See p. 196)

FIG. 103—*Primula sibirica* (See p. 199)

Photo, F. Ludlow

Photo, Royal Botanic Garden, Edinburgh

THE PRIMULAS OF KASHMIR

FIG. 104—*Primula macrophylla* (See p. 200)

FIG. 105—*Primula macrophylla* var. *Moorcroftiana* (See p. 201)

Photo, J. E. Downward

FIG. 106—*Magnolia Campbellii*, 'White form' **F.C.C.** April 3, 1951. Exhibited by C. WILLIAMS, Esq., M.P., Caerhays Castle (See p. 218)

P. farinosa in almost all essential points, differing only in the possession of a more elongate corolla tube, and it seems to me doubtful if this plant is really worthy of specific rank. It is said to be efarinose by a number of authorities (including PAX who first described it) but in Kashmir specimens this is certainly not the case. The amount of farina on individual plants varies, but it never seems to be entirely absent provided plants are examined in the fresh state. In herbarium material the meal tends to become lost with age. The flowers are lilac-pink with a yellow eye and are borne in little round clusters on a slender scape 3–9 inches in height. In Kashmir it grows in damp grassy pastures, or on rocky hill-slopes, at elevations varying from 9,000 feet to as much as 17,000 feet. I can find no record of this plant in cultivation but it should be no more difficult to raise from seed than *P. farinosa*. The name commemorates a distinguished Himalayan and Central Asian traveller who lived in the middle of the last century.

We have a number of gatherings:—

252 Barloongma Nullah, Baltistan, 9,000 feet, 2.5.28; 291 Turmik Nullah, Baltistan 11,000 feet, 19.5.28; 562 Skyangpoche, Karakoram Trade Route, Ladak, 15,000 feet, 24.7.29; 8382 Fotu La, Ladak, 14,000 feet, 7.6.41; 8403 Khardong La, Ladak, 15,500 feet, 18.6.41; 9386 Khardong La, Ladak, 16,000 feet, 2.7.45; 9390 Khardong La, 17,000 feet, 23.7.45; 9395 Khardong La, Ladak, 16,000 feet, 3.9.45.

8 *Primula sibirica* Jacqin

This Primula is widely distributed throughout the whole of Palaearctic region from Scandinavia to Alaska and Siberia to Ladak. Throughout this vast expanse of territory there are many variations especially in regard to the size of the calyx and corolla, and length of the corolla-tube. It is common in Ladak and Baltistan where it grows on sedgy hillocks and soggy alpine swards between 12,000 and 15,000 feet, but we have never seen it in Cis-Himalayan Kashmir within the Jhelum and Chenab drainage basins. Its nearest relative is *P. tibetica* which it resembles so strongly that were it not that the two species are cytologically different there would be little, if any, justification for separating them. Indeed from the wide range of herbarium specimens which I have examined many could on the present basis of distinction, be equally well referred to either species.

P. sibirica varies greatly in size. Some plants are little more than ½ inch in height, whilst others have scapes up to 12 or, in one extreme instance, 16 inches long. (Fig. 103.)

P. sibirica is easily raised from seed, or increased by division. The specific epithet refers to the country in which it was first collected.

We have the following gatherings, all from Ladak:—

591 Murgo, Karakoram Trade Route, 14,800 feet, 2.8.29, "near springs"; 822 Gogra, Changchenmo, 15,500 feet, 20.7.31, "marshy ground"; 8376 Fotu La, Leh Treaty Road, 12,500 feet, 6.6.41, "on grassy mounds in swamp areas; Gya, 13,500 feet, 15.7.41, "grassy river banks amongst caragana bushes."

This plant is figured in the *Botanical Magazine*, Vol. 59, Tab. 3167.

NIVALES SECTION

9 *Primula Duthieana* Balf. & W. W. Sm.

This handsome Primula was discovered by DUTHIE for the first time on the Burzil Pass, Kashmir, at 12,000–13,000 feet in September 1893. Specimens of this gathering, labelled 14031 *P. Stuartii* Wall, are in the Kew and British Museum Herbaria, and have hitherto escaped notice. Four years later DUTHIE's collector INAYAT KHAN again found this Primula in the Hazara district of the North-West Frontier Province. Neither BLATTER nor COVENTRY mention it in their publications on the Kashmir flora, and it was not found again in Kashmir territory until we re-discovered it in the Barai Valley of the Kishenganga in July 1935. In October 1940 we obtained fruiting specimens and an ample supply of seed on the Nurinar Pass bordering on Kagān, but no record of germination or flowering has come to our notice. *P. Duthieana* is a very desirable plant for the rock garden, but it belongs to a section whose members are notoriously difficult to raise from seed, and it looks as though *P. Duthieana* is going to prove equally intractable.

It is interesting to note that DUTHIE's Primula has marginal farina on its leaves similar to that on the high altitude, dark purple form of *P. macrophylla* which it also resembles in its habitat, being found on the banks of glacier rivulets and amidst rocks and boulders at high elevations (12,000–14,000 feet). But *P. Duthieana* also develops a very distinct farinose resting bud in the autumn which suggests relationship with *P. Stuartii*. Both scape and pedicels elongate rapidly during the fruiting period, when the former may attain a length of 12–18 inches and the latter 2–3½ inches. (Fig. 99.)

HOLDSWORTH gives a good account of this Primula, illustrated with a number of excellent habitat photographs in the *Quarterly Bulletin of the Alpine Garden Society*, Vol. VIII, pp. 19–20. The specific epithet is in honour of its discoverer who was at one time Superintendent of the Botanic Gardens at Saharanpur, India.

We have two gatherings:—

1482 Barai Valley, Kishenganga, 14,000 feet, 29.7.35; 8255 Nurinar Pass, Kagān Frontier, 13,000 feet, 7.10.40.

10 *Primula macrophylla* Don

This handsome Primula extends from Afghanistan to S.E. Tibet and is, without doubt, one of the most polymorphic species in the whole genus. In Kashmir even the typical plant has more than one facies. For example, there is a most attractive form well illustrated by COVENTRY (Vol. 11, p. 72) which seems at first glance quite distinct. The flowers are of the darkest purple, the eye black, and the leaf margins streaked with silvery farina. The plant is large and very striking, with leaves 12 inches long and a scape which may attain a length of 18 inches. It grows in clumps along the banks of glacier streams and near the summits of passes on, or south of, the main Himalayan Range, and seems easily distinguishable from all other forms. (Fig. 104.) Yet careful examination

of herbarium material from elsewhere in the Himalayas reveals intermediate stages which link it with forms in which the flowers may be violet, or lilac, or mauve, the eye white or yellow, and the leaves completely farinose on the under surface, or quite efarinose. Outside Kashmir, as one proceeds eastwards towards the Bhutan and Assam Himalaya, other subtle changes become noticeable. The leaves instead of being entire become crenulate or serrulate, the farina yellow, the calyx black, and the capsules swollen. It is impossible to separate any of these forms specifically and the most sensible course to pursue seems to be to allow *P. macrophylla* the greatest liberty in its size, shape, and coloration. Three varieties, however, have been described, or tentatively recognized, from Kashmir, viz.:—

(a) *P. macrophylla* var. *Moorcroftiana* Wall.

This variety differs from the typical plant in its smaller size, longer bracts, and notched corolla lobes, but these differences are not always constant, and in extreme cases it is very nearly impossible to separate this variety from typical *P. macrophylla*—at least that is my experience. This plant was in cultivation in COL. SHAW MACKENZIE'S garden at Balblair in 1945. (Fig. 105.)

(b) *P. macrophylla* var. *lanceolata* Watt.

In this variety the leaves are very narrowly lanceolate and the petioles well defined and about equal to the lamina in length. The only examples which we have found were growing on a rock face at Thajwas in the Sind Valley.

(c) *P. macrophylla* var. ?

This variety comes from the Kishenganga. The inflorescence is very slender and the oblanceolate leaves have long petioles equalling the lamina in length. The flowers vary in colour from violet-purple to bright rose-purple, or almost wine coloured in partially opened flowers. The plants were growing in the shelter of rocks and boulders generally with overhead protection. This variety—if indeed it is a true variety—has never been described but is incorporated in the herbarium at Edinburgh under the tentative epithet "gracilis" pending the receipt of further material.

The following varieties occur outside Kashmir:—

P. macrophylla var. *Aitchisonii* Pax, with thick fleshy leaves from Afghanistan.

P. macrophylla var. *macrocarpa* Watt, with large fat capsules from Nepal to S.E. Tibet—perhaps the most distinctive variety of all and at present in cultivation in MAJOR GEORGE FINLAY'S wonderful garden at Keillour Castle, Methven.

P. macrophylla var. *ninguida* W. W. Sm., with the calyx cut almost to the base into linear segments, from S.E. Tibet.

The large number of varieties mentioned above serve to emphasize the extreme variability of this species.

P. macrophylla and its varieties, especially var. *Moorcroftiana* are by no means impossible plants to flower, but they are very difficult to keep.

We have numerous gatherings of this species. The following are from Kashmir only :—

P. macrophylla Don.

106 Mantnar Valley, 10,500–12,000 feet, 20.6.39; 157 Sinthan Pass, 14,000 feet, 30.6.39; 172 Sinthan Pass , 13,000 feet, 2.7.39; 7656 Zaiwan, 17.6.40; 7862 Haramukh, 13,000 feet ; 29.7.40; 7918 Thajwas, 13,500 feet, 13.8.40; 8197 Sinthan Pass, 13,200 feet, 8.9.40; 8401 Khardong La, 16,000 feet, 18.6.41; 8413 Khardong La, 16,500 feet, 18.6.41; 8521 Taglung La, 17,000 feet, 24.7.41; 8570 Khardong La, 17,000 feet, 7.9.41; 9149 Barnaj, Valley, Kishtawar, 10,000 feet, 7.7.43; 9317 Rajparyan Sanctuary, 12,500 feet, 17.8.43; 9357 'Rajparyan Sanctuary,' 13,000 feet, 23.8.43; 9358 Rajparyan Sanctuary, 12,500 feet, 23.8.43; 9370 Rajparyan Sanctuary, 11,000 feet, 24.8.43.

P. macrophylla var. *Moorcroftiana* Wall.

15 Bringhi Valley, 12,000 feet, 9.7.37; 109 Mantnar Valley, 11,500 feet, 20.6.39; 439 Sasir La, 16,000 feet, 25.7.28; 819 Marsemik La, 17,000 feet, 16.7.31; 8171 Mantnar Valley, 11,000 feet, 5.9.40; 8214 Mantnar Valley, 13,000 feet, 11.9.40; 9148 Barnaj Valley, Kishtawar, 10,000 feet, 7.7.43; 9315 Rajparyan Sanctuary, 12,500 feet, 17.8.43.

P. macrophylla var. *lanceolata* Watt.

7919 Thajwas, Sind Valley, 13,500 feet, 13.8.40.

P. macrophylla var. ?

1491 Barai Valley, Kishenganga, 11,000 feet, 1.8.35.

11 *Primula obtusifolia* Royle

This Primula was originally discovered by ROYLE in Kunawar in 1831, and then, except for an occasional gathering, was lost sight of for over a century. The status of this plant remained obscure until 1939, when MAJOR SHERRIFF, at the request of SIR WILLIAM WRIGHT SMITH, sent his Lepcha collector, TSONGPEN, to the Baspa Valley in the Simla Hill States, and to the Rupin Pass in the Dhalaodar Range, for the express purpose of re-discovering this plant. This he accomplished very successfully, and a very full account of the history of this Primula, and TSONGPEN'S quest, is to be found in the *Proceedings of the Linnean Society* published on August 8, 1941, pp. 108–118.

In July 1943 I discovered this Primula in the Bangar Nullah in the Kishtawar district and this appears to be the sole record for Kashmir. Its nearest relative is *P. macrophylla* from which it is distinguished by its thin membranous leaves and small capsules. The flowers are purple or blue-purple and are borne on a scape which may attain a length of 18 inches, but much shorter scapes are normally met with and the plant seems to vary greatly in this respect.

P. obtusifolia is a very lovely plant indeed, and is less difficult to cultivate than the majority of Nivalids. At one time it grew riotously in COL. SHAW MACKENZIE'S garden in the Black Isle, whilst seeds which we sent to England in 1940 produced plants which flowered in many gardens in succeeding years. As recently as May 1950 MR. JACK DRAKE of Aviemore exhibited a magnificent pan of this species at the Scottish

Rock Garden Club Show at Edinburgh. This Primula is represented in our collection by several gatherings from the Simla Hill States but we have only a single gathering from Kashmir:—

9268 Bangar Valley, Kishtawar, 12,500 feet, 31.7.43.

The plant figured in the *Botanical Magazine*, Vol. 113, Tab. 6956 as *P. obtusifolia* is certainly not that species, and appears to be *P. Calderiana*.

DENTICULATA SECTION

12 *Primula denticulata* Smith

This plant is perhaps the commonest and most wide-spread Primula in Kashmir, and has been found at all elevations between 5,000–15,000 feet. At its lowest levels it comes into flower as early as March, whilst at the highest elevations it may still be in bloom as late as September. Plants vary greatly in size in different localities and the scape may range from 2 inches to as much as 18 inches in length. In some cases leaves and flowers appear together, but in most instances the leaves are not fully developed until the plant has been in flower for some time. This is one of the hardiest and commonest Primulas in cultivation and can be raised easily from seed or by division. Its nearest allies are *P. atrodentata* from the eastern Himalaya, and *P. erosa* from Kumaon. It occurs through the entire length of the Himalaya from Kashmir to Assam. It is represented in our collection by the following numbers:—

304 Turmik Nullah, 9,000 feet, 24.5.28; 1401 Tragbal Pass, 11,000 feet, 17.7.35; 1458 Barai Pass, Kishenganga, 12,000 feet, 22.7.35; 19 Bringhi Valley, 9,000 feet, 15.5.39; 9193 Bhujaz, Zanskar Frontier, 12,000 feet, 15.7.43; 9247 Bangar, Kishtawar, 10,500 feet, 30.7.43.

P. denticulata is figured in the *Botanical Magazine*, Vol. 113, Tab. 6916.

13 *Primula erosa* Wallich

This plant has been included in the Primulas of Kashmir by BLATTER who records it from Ladak without any definite locality. Although I have visited Ladak on many occasions and collected extensively in this outlying district of Kashmir I have never encountered the species, nor are there any records from Kashmir in the Kew, British Museum and Edinburgh herbaria.

P. erosa is akin to *P. denticulata* in so many particulars that it is sometimes regarded as a mere form of the latter, but the two plants can always be distinguished by the fact that *P. denticulata* has prominent bud scales, whilst *P. erosa* has none. *P. erosa* normally comes from a lower altitude than *P. denticulata*, and has so far never been recorded from a greater height than 9,500 feet, which makes the Ladak record rather dubious.

P. erosa comes mainly from the central Himalaya, but there are a few records from Dalhousie and Lahul in the western Himalaya. There is a record by GRIFFITH from Bhutan in 1838 which is extraordinary as the plant has never been found in that country since,

although a good deal of collecting has taken place in Bhutan of recent years.

The plant figured in the *Botanical Magazine*, Vol. 113, Tab. 6916, is *P. glomerata* and not *P. erosa*.

MINUTISSIMAE SECTION

14 *Primula minutissima* Jacqin

This little Primula was first discovered by ROYLE at Kunawar in 1831. It occurs throughout the western and central Himalaya from Kashmir to Kumaon and is tolerably common in the alpine regions of Ladak and Baltistan where it grows in mats on the grassy banks of streams, and on damp mossy rocks. Its small lanceolate leaves, covered on the under surface with yellow farina, readily separate it from the efarinose *P. reptans* with which it might possibly be confused.

In 1882 WATT distinguished a plant as *P. Heydei* (*Journal Linnean Society*, Vol. xx, p. 5) on the grounds that it differed from *P. minutissima* in the possession of a scape of 1–3 inches long. In *P. minutissima* the scape was said to be either absent or barely discernible. In all other important respects the two plants were said to be similar though the scape of *P. Heydei* was mistakenly supposed to carry more flowers than that of *P. minutissima*. Since the scape in Primulas frequently elongates during the fruiting stage this factor alone can hardly be regarded as a reliable one to distinguish *P. Heydei*, and my own experience of these two plants in the field fully confirms this doubt.

No. 8515 was gathered in fruit on the Taglung La, Rupshu, Ladak—the type locality of *P. Heydei*, and shows the characteristic elongate scape. Unfortunately I was unable to obtain flowering specimens from this locality. I was more fortunate, however, in my gatherings on the Khardong La near Leh. No. 8414 was made in the flowering stage on this pass on June 18, 1941 at 15,500 feet. The plants were then entirely escapose, and the gathering was accordingly identified as *P. minutissima*. Two months later, on August 7, 1941, I took No. 8542 from exactly the same place as No. 8414, and since these later fruiting specimens now showed scapes 2–3 inches in length the plants were identified as *P. Heydei*! A careful examination of herbarium material in the British Museum and Kew reveals intermediate stages in the development of the scape, and in two gatherings, viz. No. 7387 from the Baspa Valley in the Simla Hills, and No. 9159 from the Barnaj Valley, Kishtawar, there are plants in the flowering stage with scapes from $\frac{1}{2}$–$\frac{3}{4}$ inch in length. On the strength of this evidence, and in the absence of any other distinguishing feature, it would appear that the length of the scape is of no diagnostic value, and that *P. Heydei* should now be reduced to *P. minutissima*.

We have the following gatherings:—

8414 Khardong La, 15,500 feet, 18.6.41, "on banks of streams, amongst grass; flowers rosy-purple to lilac with a whitish yellow eye"; 8515 Taglung La, Rupshu, 16,500 feet, 23.7.41; 8542 Khardong La 15,500 feet, 7.8.41; "Fruiting specimen of 8414, seed taken"; 9159

Barnaj Valley, Kishtawar, 10,000 feet, 8.7.43; 9387 Khardong La 15,500 feet, 9.7.45; 9388 Khardong La, 16,000 feet, 23.7.45, "Flowers for the most part over; in mats on wet grassy slopes"; 9389 Khardong La, 17,500 feet, "Corolla violet with white eye; in mats on wet grassy swards"; 9394 Khardong La, 17,500 feet, 3.9.45: "Fruiting specimens of 9389."

15 *Primula reptans* Hook.f.

COVENTRY states that this charming dwarf Primula is confined to Kashmir, but this is not so as herbarium specimens are available from Hazara and also from Kulu and the Simla Hill States, and from localities as far east as Kumaon.

P. reptans is entirely devoid of farina, a character which immediately separates it from *P. minutissima*.

We have no record of this Primula from the Trans-Himalayan districts of Ladak and Baltistan, but it is abundant in Kashmir proper where it grows in dense mats on rocks, and steep stony hill slopes at elevations between 11,000 and 14,000 feet. It flowers in June and July and has often been raised from seed in this country but its survival in gardens has always been rather precarious. In the Royal Botanic Garden at Edinburgh, however, it has done very well indeed during the last two years both in pans and in a cool frame and on the peat walls. In the latter spot it had to be covered with fine wire netting to prevent birds tearing the plants out of the ground. As yet it has not been proved to be very floriferous. It owes its name to its creeping stoloniferous habit.

We have the following gatherings:—

20 Ahlan Valley, 12,000–13,000 feet, 10.7.37, "Flowers dark violet; on rocks and boulders amidst moss"; 120 Mantnar Valley, 12,500 feet, 22.6.39, "on damp smooth rock faces"; 7863 Haramukh, 13,000 feet, 29.7.40.

FLORIBUNDAE SECTION

16 *Primula floribunda* Wallich

With the possible exception of *P. Inayatii* no other Primula in Kashmir grows at so low an altitude as *P. floribunda*. I have not noticed it in the wild state north of the Pir Panjal but it is to be found between 2,500 and 8,000 feet on the southern slopes of this range, whence it extends eastwards to Kumaon, and westwards into Afghanistan. It grows on moist rocks and cliff faces, and is a straggling, rather unkempt, plant covered all over with glandular jointed hairs. It bears a number of scapes 4–6 inches long, carrying two or more whorls of yellow flowers. There are many Primulas with greater attractions than *P. floribunda*, and perhaps its chief title to fame lies in the fact that it is one of the parents of the remarkable hybrid *P.* × *kewensis*. In Baluchistan there occurs a Primula very similar in appearance to *P. floribunda*, known as *P. lacei*, which has been lost sight of for over a generation. It differs from *P. floribunda* in having solitary flowers with a long tube, and a woody stem.

P. floribunda is represented in our collections by the following gatherings:—

7586 Bannihal, 6,000 feet, 1.4.40; 35 Poosiana, Pir Panjal, 7,000 feet, 31.7.37; 9286 Shiroti (Kishtawar District) 8,000 feet, 2.8.43. It is figured in the *Botanical Magazine*, Vol. 109, Tab. 6712.

SOLDANELLOIDEAE SECTION

17 *Primula Reidii* Duthie

This dainty little species with ivory-white flowers was first discovered by DUTHIE in Garhwal in 1883. In the following year he obtained it in Kumaon, and it has since been found in Kulu and Chamba. It was unrecorded from Kashmir until we found it near the Sinthan Pass in July 1937 growing in rock crevices at 11,000 feet. In 1943 we also found it south of the Pir Panjal Range in the Bangar Valley in the district of Kishtawar again growing on a rock face.

P. Reidii belongs to the Soldanelloideae section, a rock-loving group of Primulas of great beauty which are particularly abundant in Bhutan where no fewer than ten out of the twenty-two species included in the section, are to be found.

Like most white Primulas, *P. Reidii* is deliciously fragrant with a perfume reminiscent of jasmine. Its nearest ally is undoubtedly *P. Wigramiana* W. W. Sm. from Nepal and the two species are so closely allied that it is at times very difficult to distinguish them. *P. Wigramiana* on the whole is a larger plant and lacks the annulus of *P. Reidii*, but these differences are not very satisfactory, and not always apparent. This plant has always been intermittently in cultivation since 1887 but it has always been rare. MR. and MRS. J. T. RENTON of Branklyn, Perth, have grown it continuously for the past twenty-five years. The specific epithet is in honour of DUTHIE'S companion who accompanied him on his journey in 1883 when the plant was first discovered. (Fig. 100.)

It is the sole representative of its section in the western Himalaya and is represented in our collection by the following gatherings:—

180 Sinthan Pass, 11,500 feet, 4.7.39, "Amongst moss under boulders or in clefts of rocks. Flowers snow-white; no eye; very fragrant; never seen this Primula before in Kashmir"; 9239 Bangar, Kishtawar, 10,500 feet, 30.7.43; 9380 Rajparyan Game Sanctuary, 11,000 feet, 1.8.43.

This plant is figured in the *Botanical Magazine*, Vol. 113, Tab. 6961.

ROTUNDIFOLIA SECTION

18 *Primula rotundifolia* Wallich

BLATTER, following HOOKER and PAX, records this Primula from Kashmir but there appears to be no herbarium specimen to support this statement, and, according to WRIGHT SMITH and FLETCHER this plant does not occur west of Nepal. Certainly in our extensive travels throughout the State, we have not seen the species.

MODERN METHODS OF WEED CONTROL

Dr. E. Holmes, M.Sc., F.R.I.C.

(*Lecture given on March* 20, 1951; MR. F. A. SECRETT, C.B.E., F.L.S., V.M.H., *in the Chair*)

IN the past few years I have been privileged to talk about weedkillers on the same platform as PROFESSOR G. E. BLACKMAN. That has not been an unmixed blessing. He has usually opened the proceedings with a general review of the subject and, in the process, has stolen some of my thunder. He is not on the platform with me to-day, but he did address you on the same subject back in 1947, the paper being reported in your JOURNAL for 1948, pages 134 to 144. (Incidentally, I thought it poetic justice that PROFESSOR BLACKMAN complained that the Chairman on that occasion, DR. J. RAMSBOTTOM, had stolen some of his thunder!)

The point I really want to make is that we have been working very hard on chemical weedkillers since 1947 but, on re-reading PROFESSOR BLACKMAN'S paper recently, I was amazed to find that we knew so many answers then, yet we still do not know the answers to many of the problems then propounded. We have been consolidating our earlier work rather than breaking much new ground.

To-day I shall endeavour to give you a picture of the stage we have reached in the chemical control of weeds, and some pointers as to the direction in which we may expect to see further development.

But may I make two points abundantly clear at the outset. We have comparatively few chemical answers to the weed problems of the gardener as distinct from those of the farmer. Second, chemicals are *not* a substitute for good cultivation. The gardener and farmer must grow plants or crops the best way he knows, by traditional methods, and regard weedkillers, whenever they can be used, as valuable but supplementary aids. (May I add that that statement was not included specially for MR. SECRETT'S benefit, though I am of opinion that weeds just dare not grow on his farms!)

GENERAL AND SELECTIVE WEEDKILLERS

Before, however, dealing seriously with the use of selective weedkillers, that is chemicals which distinguish between and act upon different species of plants, let us look for a moment at general weedkillers. These are the chemicals which, at practical dosages, kill all forms of vegetation.

The distinction between general and selective weedkillers is not absolute, but rather a matter of degree. If tiny amounts of sodium chlorate or sodium arsenite are applied to mixed populations of plants they will kill some and not others, but they are not selective enough for practical purposes. On the other hand, if very large amounts of the so-called hormone weedkillers are used, they will kill or seriously damage most plants. At low dosages, however, they are so selective as to be capable of use for killing weeds growing in many valuable crops.

Of the general weedkillers, sodium chlorate and sodium arsenite, just mentioned, and certain coal tar derivatives are very useful, and are used on roads, paths, waste ground and hard tennis courts. Chlorate is in my personal opinion the best, as it is non-poisonous and acts over a long period. It must, however, be handled with care as, under some conditions, it can cause fires or even explosions. Any clothes which have become soaked with chlorate solution must be washed with plenty of clean water, and the dry product must not be allowed to mix with organic dusts or with oils.

Sodium arsenite is almost as efficient, but is obviously very poisonous and must not be allowed to get into unauthorised hands.

The coal tar products are classed as poisons, but are nothing like so dangerous as sodium arsenite, especially when diluted, and exhibit no fire hazard. They tend to burn off the tops of weeds particularly of grasses, without killing out the roots which may provide new growth.

I mentioned just now the so-called hormone weedkillers. These are more properly described as plant growth regulators, and are mostly derivatives of chemicals with the cumbersome names of 2-methyl, 4-chloro-phenoxyacetic and 2,4-dichloro-phenoxyacetic acids. Fortunately for our purpose these are now shortly described as MCPA and 2,4-D, respectively.

There is, however, a further complication. These chemicals are now available in different forms known as sodium salts, amine salts and esters, but for convenience of comparison the scientist is able to calculate the "acid equivalent" of each of these different forms. Generally speaking the sodium salts are very efficient, cheap, and the safest on crop plants. In this country, the amine salts are sometimes slightly more efficient on a comparable basis, but are rather more expensive. Under hot, dry climatic conditions the amines are sometimes much more efficient. Both are available as water solutions or as solids readily soluble in water. The esters are the most effective, most expensive and most damaging to crop plants—in other words their margin of safety is lowest.

It is worth noting that, in agriculture, the practical use of these new chemicals developed on cereals long before their use on pasture and other crops. This was because they were discovered during the course of experiments on Oats and, more particularly, because the economic benefits from their use could readily be demonstrated. On the gardening side, their use on cultivated turf—lawns, golf courses and sports grounds generally—developed at the expense of their use on vegetables simply because they killed many of the prevalent weeds without danger to turf and, on the other hand, were dangerous to many vegetables.

We may consider these developments briefly in that order.

WEEDKILLERS ON CEREALS

Work by my colleagues at Jealott's Hill and Fernhurst Research Station during the past eleven years, and by the world at large in the past seven years, has given us a very clear picture of the cereal weeds which can be controlled and those which are too resistant to be treated usefully. I have incorporated these in a series of four lists, as follows:—

Weeds Susceptible to MCPA and 2,4-D

Buttercup, Corn (Starveacre)	*Ranunculus arvensis*
Cabbage, Field	*Brassica campestris*
Charlock, Yellow (Wild Mustard, Kilk)	*B. Sinapis*
Fat Hen (Goosefoot, Dungweed)	*Chenopodium album*
Orache	*Atriplex patula*
Pennycress	*Thlaspi arvense*
Poppy (seedling)	*Papaver Rhoeas*
Shepherd's Purse	*Capsella Bursa-pastoris*
Treacle Mustard	*Erysimum cheiranthoides*
Wild Radish (White Charlock, Jointed Charlock, Runch)	*Raphanus Raphanistrum*

Moderately Susceptible Weeds

Cornflower	*Centaurea Cyanus*
Day Nettle (Hemp Nettle)	*Galeopsis Tetrahit*
Dock, Broad-leaved (young)	*Rumex obtusifolius*
Dock, Curled	*Rumex crispus*
Hardheads (Knapweed)	*Centaurea nigra*
Hoary pepperwort (Hoary Cress, Chalk Weed)	*Lepidium Draba*
Shepherd's Needle (Venus's Comb)	*Scandix Pecten-Veneris*
Sowthistle, Common	*Sonchus oleraceus*
Sowthistle, Corn	*S. arvensis*
Tares (Vetches)	*Vicia* spp.
Thistle, Creeping	*Cirsium arvense*
Thistle, Spear	*C. lanceolatum*

Moderately Resistant Weeds

Bindweed, Black	*Polygonum convolvulus*
Bindweed, Field	*Convolvulus arvensis*
Chickweed	*Stellaria media*
Coltsfoot	*Tussilago Farfara*
Crane's Bill	*Geranium* spp.
Fumitory	*Fumaria officinalis*
Heartsease (Corn Pansy)	*Viola tricolor*
Knotgrass (Knotweed)	*Polygonum aviculare*
Mouse-ear Chickweed	*Cerastium vulgatum*
Nettle, annual	*Urtica urens*
Persicary (Redshank, Willow Weed)	*Polygonum Persicaria*
Scentless Mayweed (Feverfew)	*Matricaria inodora*
Sheep's Sorrel	*Rumex Acetosella*

Moderately Resistant Weeds—(continued)

Sorrel	*R. Acetosa*
Speedwell	*Veronica* spp.
Spurrey (Sandweed, Yarr)	*Spergula arvensis*
Wild Onion (Crow Garlic)	*Allium vineale*

Resistant Weeds

Bracken	*Pteridium aquilinum*
Brambles	*Rubus* spp.
Cleavers (Herrif)	*Galium Aparine*
Corncockle	*Lychnis Githago*
Corn Marigold	*Chrysanthemum segetum*
Dock, Broad-leaved (mature)	*Rumex obtusifolius*
Grasses	*Gramineae*
Parsley Piert	*Alchemilla arvensis*
Wood Sorrel	*Oxalis* spp.

The general picture of the control of weeds in the first two categories is well known, but I would indicate the highlights. Both MCPA and 2,4-D are used against the really susceptible weeds of cereals in amounts around ¼ to 1 lb. of active material per acre, depending upon the particular derivative used. By far the greatest usage is by low-volume spraying machine, but when dusts are used the amount of active material per acre has to be increased.

The best time of application against annual weeds is when the cereal crop is 4 to 6 or 8 inches high and the weeds in the seedling stage. At this stage least damage is done to the crop both by the chemical and, mechanically, by the wheels of the tractor and sprayer. Against perennials it is desirable to wait until these weeds are about three-quarters grown and beginning to show flower buds.

Application should not be made in showery weather, but rather when at least twenty-four hours of fine weather is in prospect.

Generally speaking, best results against weeds, and least damage to the crop, are experienced when both weeds and crop are growing vigorously.

Results of such applications are often quite slow in appearing. Charlock seedlings may show damage within twelve hours on a hot sunny day, but more usually it is several days or even a week or so before many weeds succumb.

Most of these considerations apply, of course, to the use of the same products on weeds in pasture and cultivated turf.

On the economic side, it may be said that for an outlay on materials and application of anything from 15*s.* to 50*s.*, the return in increased cereal crops per acre may be 70*s.* to 110*s.* or more.

PRE-EMERGENCE WEEDKILLING

Experimental results in the past year or two suggest that a new technique of applying plant growth regulator weedkillers a few weeks before crop plants emerge from the seed bed, a technique known as pre-emergence

application, may give valuable results in the future on other valuable crops. Such applications of MCPA and 2,4-D, together with a new chemical, isopropyl-phenyl-carbamate (IPPC), have controlled a wide range of noxious weeds emerging from seed beds of such crops as Kale, Sugar-beet, Mangolds and Swedes, Field Beans, Peas, Onions and Lettuce. Much more work is needed before firm recommendations can be made, and I should make it clear that IPPC is not yet available commercially at an attractive price.

DNOC WEEDKILLERS ON CEREALS

Before leaving the subject of weedkillers on cereals, I must say a word or two about the dinitro-ortho-cresol (DNOC) types. I shall not say many words, for a variety of reasons. They are of no direct interest to gardeners; they can be extremely dangerous in use, both to the people handling them and to animals and game; they are only really necessary at present against a relatively few weeds resistant to the "hormone" types; and I, personally, have not done very much work with them.

Although that sounds a little damning, may I hasten to add that DNOC does certain weedkilling jobs far better than anything else, in particular the control of Cleavers or Herrif, Scentless (or Stinking) Mayweed and poppies that have been allowed to get beyond the seedling stage.

DNOC is used in a variety of forms; as the cresol derivative itself (sometimes activated by addition of ammonium sulphate); and as the sodium, ammonium and, occasionally, the amine salts. The most generally used spray contains 5 to 8 lb. of DNOC itself, in suspension, and 10 lb. of ammonium sulphate, in solution, in anything from 30 to 100 gallons of water per acre.

A related product, dinitro-secondary-butyl-phenol (DNSBP), also shows much promise against weeds of Peas and Lucerne.

WEEDKILLERS ON GRASSLAND

Returning to the plant growth regulator weedkillers, the situation regarding control of weeds in grassland is quite reasonably clear so far as concerns technical performance, but the economic picture has still to be established.

The following Weeds are Controllable by MCPA or 2,4-D:

Buttercup, Bulbous	*Ranunculus bulbosus*
Buttercup, Creeping	*R. repens*
Buttercup, Crowfoot	*R. acris*
Coltsfoot	*Tussilago Farfara*
Daisy, Ox-eye	*Chrysanthemum Leucanthemum*
Dandelion	*Taraxacum officinale*
Docks	*Rumex* spp.
Nettles, perennial	*Urtica dioica*
Ragwort	*Senecio Jacobea*
Rushes	*Juncus* spp.
Silverweed	*Potentilla Anserina*
Thistle, Creeping	*Cirsium arvense*

The susceptibilities of these weeds show considerable differences. Creeping Buttercup is quite readily killed by reasonable dosages of MCPA, say 2 lb. active agent per acre, and in this instance MCPA is quite appreciably more efficient than 2,4-D. Bulbous Buttercup is much more resistant but I, personally, have eliminated it from my own lawn on the heavy soil of the Weald of Kent by a single application in early June of 5 lb. MCPA per acre. Other members of the Buttercup or Crowfoot family are probably intermediate in resistance.

Seedling and curled-leaved Docks, Creeping Thistles and Rushes are also controlled by MCPA and 2,4-D at from 2 to 4 lb. active material per acre. On the other hand old-established broad-leaved Docks, over two years old, are resistant even to much higher dosages. Ragwort has in some instances been readily killed by moderate dosages; sometimes it has proved unexpectedly resistant, and research work continues.

Seedling Clovers are often killed by the rates of application of MCPA and 2,4-D just mentioned, but though established Clovers may suffer a set-back they seem to recover rapidly.

I said earlier that the economics of such applications to grassland have not yet been worked out satisfactorily. However that may be, there is no doubt that pasture which is almost derelict because of high weed populations may be vastly improved by application of these selective types of weedkiller, especially if other measures of renovation—drainage, liming and addition of fertilizers—are simultaneously taken. As for the home paddock or steep, unploughable grassland infested with weeds, application of MCPA or 2,4-D is the only effective operation open to the farmer.

At this point I would add that "spot" treatment with quite heavy applications of weedkiller, by means of a knapsack sprayer, is worth considering. It is specially valuable for isolated patches of Thistles near an old corn-stack, for patches of Rushes or just Nettles round the farm buildings.

WEEDKILLERS ON CULTIVATED TURF

You may feel that in dealing with weedkillers on cereals and grassland first I am being a little hard on a predominantly gardening audience. But I prefer to put first things first, and that is how developments have gone in the past decade. Now we come a little nearer home—to deal with weedkillers in cultivated turf, in which sphere the plant growth regulator types have been quite outstanding.

Fortunately, work at a number of research establishments, including the St. Ives Research Station of the Board of Greenkeeping Research, Bingley, Yorkshire, has shown that a large number of the worst weeds of lawns are susceptible, in greater or lesser degree, to MCPA and 2,4-D. I would list these weeds in three categories: (*a*) those that are killed by a single application of 2 or 3 lb. per acre of the active agent, (*b*) those that are killed by two applications, and (*c*) those that are much reduced though not always killed by three applications, as follows:

(*a*)	Buttercup, Creeping .	*Ranunculus repens*
	Cat's-ear . . .	*Hypochaeris radicata*
	Plantains . . .	*Plantago* spp.
	Starweed . . .	*Plantago coronopus*

(*b*)	Crane's Bill . .	*Geranium* spp.
	Daisy . .	*Bellis perennis*
	Dandelion . .	*Taraxacum officinale*
	Hawkweed . .	*Hieracium* spp.
	Knapweed . .	*Centaurea nigra*
	Self-heal . . .	*Prunella vulgaris*
	Sorrel . . .	*Rumex Acetosa*
(*c*)	Bird's-foot Trefoil .	*Lotus corniculatus*
	Chickweed, Mouse-ear	*Cerastium vulgatum*
	Clover . . .	*Trifolium* spp.
	Pearlwort . .	*Sagina Procumbus*
	Yarrow . . .	*Achillea millifolium*

With the multiple treatments the intervals between treatments should be three to four weeks. Application may start in March or April, preferably when a period of warm, settled "growing" weather is promised. Drought before treatment on the one hand, and heavy rain soon after treatment on the other, will reduce efficiency.

Nitrogenous fertilizer application a few weeks before weedkiller treatment frequently increases the efficiency of weed control and, of course, helps the grasses to colonize the bare patches left by removal of weeds, especially of course those prostrate weeds such as Dandelions and Plantains.

In addition to the weeds already mentioned in this section, nettles, Horsetails, Thistles and Docks, whenever they occur in lawns, may be killed by a heavy application of MCPA or 2,4-D. In these instances some temporary bleaching of the grass may be experienced.

There is considerable argument as to whether MCPA (as sodium salt) or 2,4-D (as sodium or amine salt) is the more efficient turf weedkiller. Frankly I have yet to see convincing evidence that either is better than the other, on an equal "acid equivalent" basis, against the generality of weeds. In particular instances there can be considerable differences. For example, MCPA is definitely better than 2,4-D against Pearlwort, Buttercups and even Woodrush (*Luzula campestris*). On the other hand, 2,4-D is better against Daisies, and if it is likely to be necessary to re-seed sections of turf shortly after application, 2,4-D is preferable. Both are toxic at quite low dosages to *seedling* grasses, but the effect of 2,4-D in the soil disappears much more quickly than that of MCPA.

Before leaving this section of my subject I must mention the frequently-heard, but ill-founded complaint, that the use of "hormone" weedkillers causes moss on lawns. It is quite true that following the successful application of these weedkillers one does sometimes notice more moss, but this is only an indirect cause and effect. Removal of the prostrate weeds leaves bare patches of soil. If soil conditions, particularly of drainage, are such as to encourage moss, and if plant food to encourage grasses is lacking, then the moss may become established before the grasses can re-colonize these bare patches. The remedies are obvious. (I have recently heard the same story about toadstools on lawns, but so far I do not know the answer.)

WEEDKILLERS ON GARDEN CROPS

I have now, at last, arrived at a consideration of the present state of our knowledge of the use of "hormone" and other weedkillers on garden crops. As I mentioned earlier, I fear you may be disappointed—successful results are rather meagre to date, and do not offer any real replacement for the hoe.

"Hormone" Weedkillers

Peas.—The varieties of Peas, 'Meteor,' 'Onward' and 'Kelvedon Wonder' have been treated with 2½ cwt. per acre of a 1 per cent. MCPA dust without serious damage in our own trials at Fernhurst. MCPA treatment of Peas is only recommended when there is a serious infestation of susceptible weeds. The dust should not in this instance be applied when the crop is in a stage of rapid growth. MCPA in solution, and other "hormone" types are not recommended on Peas because of likely damage. I would not recommend them at all in the ordinary garden.

Potatoes.—The susceptible weeds already indicated may be killed in Potato crops. Present indications are that pre-emergence treatments with MCPA at rates up to 2 lb. per acre, and post-emergence treatments at ½ to 1 lb. per acre can be made without damage or reduction in yield to most main-crop varieties. Early varieties tend to be more susceptible and the plants have a shorter growing season in which to recover from the effects of possible "hormone" damage.

Asparagus.—Asparagus may be safely treated when in the "fern" stage with triple strength MCPA liquid at 5 pints, or with 2 cwt. of the 2 per cent. MCPA dust, per acre. Repeat applications may be given if necessary, but seedling Asparagus is liable to damage.

Strawberries.—There are great varietal differences in the reactions of Strawberries to "hormone" weedkillers. Most American commercial varieties are comparatively resistant to 2,4-D, and ½ to 2 lb. per acre are widely recommended for use in first-year and non-fruiting beds, although 2,4-D cannot be applied to flowering or fruiting plants, or to newly-set beds. Hybrid Strawberries in the U.S. have been seriously damaged by 2,4-D. Experimental work in England on the susceptibility of Strawberries to "hormone" weedkillers have shown that the varieties 'Tardive de Leopold' and 'Royal Sovereign' are relatively resistant, but much damage to the variety 'Huxley' has been reported.

Raspberries.—Raspberries appear to be comparatively resistant to "hormone" weedkillers and in cases of severe weed infestation these may be safely applied, except at flowering, provided the spray is directed away from the growing tips.

Top fruits.—These weedkillers may also be used on weeds growing among top fruits, particularly when the latter have been grassed down, provided the spray is not allowed to get on the tree foliage.

Among flowers.—Incidentally, before leaving this section of my talk, I would mention the fact that it is possible to use a painting technique to apply "hormone" weedkillers to the leaves of individual weeds such as Convolvulus. Obviously this cannot be used on a large scale, but it can prove useful against a weed growing into a valuable Rose bush.

Sulphuric Acid

Onions and Leeks.—Turning now to the use of sulphuric acid, Onions may be sprayed before emergence, using 13 gallons of B.O.V.* in 87 gallons of water, or after emergence, so soon as they have passed from the looped to the erect stage (roughly 3 inches high) using 7 gallons of B.O.V. in 93 gallons of water. Spraying may be continued until the seedlings are 7 inches high.

Leeks may also be treated at these rates before emergence, and for one month after planting out.

Bulbs.—Satisfactory results have been obtained in bulbs using pre-emergence treatments of sulphuric acid at 13 gallons of B.O.V. in 87 gallons of water. Incidentally pre-emergence treatment with "hormone" weedkillers has given satisfactory results in the United States, but this method is still in the experimental stage over here. Once the foliage has died down it is safe to use these chemicals provided one does not saturate the soil.

Petroleum Oils

Carrots and Parsnips.—Good results have been obtained with various petroleum oil sprays, particularly with fractions known as white spirits. Most annual weeds in the early stages of growth are susceptible, and control of these in Carrots and Parsnips depends on the degree of coverage obtained. If the whole area is to be sprayed, 70 to 100 gallons per acre will be required, but if the Carrots are grown in wide rows with inter-row cultivation the quantity of oil can be decreased. Carrots and Parsnips should not be sprayed before the seedlings have two true leaves, and spraying should cease before the plants have developed tap roots about as thick as a lead pencil, for fear of taint.

It will be appreciated that to be successful these oils must kill the prevalent weeds, must not do appreciable damage to the crop foliage, and must not taint the roots. Consequently do not use any supply of TVO, as has sometimes been done in the past. Either buy a relatively expensive white spirit (expensive because of excise duty), or test out the cheap TVO available, on a small scale, to see whether it is suitable and safe.

Sodium Chlorate

Rhubarb.—As a tailpiece to this section may I add that Rhubarb may be safely treated with sodium chlorate in autumn, using rates of 15 to 35 lb. per acre. This will clear out many weeds and do no harm to the growing Rhubarb in the following spring.

HOW TO AVOID DAMAGE

It will be apparent from all I have said that we are here dealing with products which, when used with care, can be extremely valuable. On the other hand they are potentially dangerous to susceptible crop plants. I would point out a few common-sense safeguards, as follows:—

(1) Never apply general weedkillers in situations where subsequent surface rain washing can transport them into soil containing valuable crops. (On the other hand, I prefer just to touch the

* B.O.V. = brown oil of vitriol = commercial, concentrated sulphuric acid.

edges of my lawns with chlorate solution—it saves so much edge trimming!)

(2) Do not use fine sprays, or dusts, of "hormone" weedkillers when wind is liable to cause them to drift on to Sugar-beet, Beans, Brassicas or other susceptible crops. The results may be disastrous. (When dealing with lawn weeds near ordinary garden plants, I prefer dilute solutions applied by a watering can with a coarse rose, rather than strong solutions through a fine spray nozzle.)

(3) Always wash all utensils that have been used with "hormone" sprays very, very thoroughly and dispose of the washings safely; better still, keep separate utensils solely for the purpose.

In conclusion, I hope I have been able to show that, despite my early cautious remarks, we have made some solid progress in this field in the past few years. I repeat that chemical weedkillers are no substitute for good cultivation, but they are very valuable supplementary aids which may be expected to find further uses on the farm and garden as research work progresses.

A NEW PEONY FROM S.E. TIBET

F. C. Stern, F.L.S., V.M.H. and G. Taylor, D.Sc., F.L.S.

IN 1936 LUDLOW AND SHERRIFF collected seeds of a fine tree Peony in S.E. Tibet, and the plant, provisionally identified as *P. lutea*, became successfully established in many gardens and it is now widely distributed.

It was soon evident that the new introduction differed in several respects from typical *P. lutea*, a species from Yunnan and Szechwan which has been cultivated for over fifty years, and it became known in gardens and referred to in literature as *P. lutea* "Tibetan form". Our observations on long series of cultivated plants and herbarium specimens confirm the view that this Peony should be given separate taxonomic status, and, accordingly, we are pleased to name it in honour of MR. F. LUDLOW, who, with MAJOR SHERRIFF, has been responsible for many notable introductions to gardens in recent years.

In S.E. Tibet *P. lutea* var. ***Ludlowii*** grows in the transition region between the monsoon belt and the dry wind-swept plateau. It is, therefore, not so exacting in its cultural requirements, and plants from this intermediate climatic zone appear to accommodate themselves more readily to the drier conditions in southern England. For example, ***Cotoneaster conspicua***, ***Codonopsis vinciflora***, and several species of ***Berberis*** from the same area are of the easiest culture in southern England.

LUDLOW's Peony is, at maturity, a taller plant than typical *P. lutea*, but it also differs in having larger more open flowers borne above the apical leaf clusters and it flowers about a month earlier in this country.

We have examined about 200 flowers of *P. lutea* var. *Ludlowii* and none has had more than two functional carpels, whereas in typical *P. lutea* the carpels vary from three to four.

Paeonia lutea var. Ludlowii Stern & Taylor var. nov. A planta typica statura majori, floribus majoribus ([5–]7–10[–12] cm. diametro), petalis patentioribus, folliculis 1–2, recedit.

Syn.: *P. Delavayi* var. *lutea* sensu Marquand in Journ. Linn. Soc. Lond. Bot. **48**, 158 (1929).
P. lutea sensu Stern, Study Gen. Paeonia, 46 (1946) pro parte, quoad plantas a Ludlow, Sherriff et Kingdon-Ward lectas.
P. lutea, Tibetan form, Stern in Journ. R.H.S. Lond. **72**, 394, fig. 157 (1947).

DISTRIBUTION

S.E. TIBET. In thickets, scrub jungle, along cultivated fields and on dry sandy and gravelly river terraces in the Charme District and Kongbo Province, between 9,300 and 10,900 ft. We have examined the following specimens: Charme Distr., Trön, Loro Chu, 25:vi:1935, *Kingdon-Ward* 11792; Charme, Char Chu, seed specimen, 22:x:1938, *Ludlow, Sherriff & Taylor* 6392; Lung, Chayul Chu, 28:iv:1936, *Ludlow & Sherriff* 1376; Kongbo Prov., Miling, Tsangpo Valley, 28:v:1938, *Ludlow, Sherriff & Taylor* 4540 (type in Herb. Brit. Mus.); same locality, seed specimen, 13:x:1947, *Ludlow, Sherriff & Elliot* 13313; Shoka, Tsangpo Valley, 23:v:1947, *Ludlow, Sherriff & Elliot* 15052; Shinji Chogyal, near Gyala, Tsangpo Valley, 8:v:1947, *Ludlow, Sherriff & Elliot* 13641.

NOTES FROM FELLOWS

Old plants in the "Orto Botanico," Padua

SINCE the publication of my article on the Orto Botanico in the JOURNAL for December 1950, I have obtained the dates at which some of the oldest trees and shrubs were planted.

The oldest shrub or tree in the Garden is a specimen of *Vitex Agnus Castus* planted in 1550. This woody shrub appears to be remarkably healthy, and the fact that it seems regularly to have been pruned back may account for its longevity. The Chaste Tree, from the Mediterranean is not common in English gardens, but it produces its racemes of attractive lilac flowers late in the season in abundance in hot summers on a wall at Kew. 'Goethe's palm,' *Chamaerops humilis arborescens*, dates from 1585 and the great Plane *Platanus orientalis* from 1670. Other old plantings are those of *Tecoma grandiflora* (the 'Goethe Bignonia'), *Populus alba*, *Carya olivaeformis* and *Ginnacladus canadensis*, which all date from 1760. The great Magnolia, *M. grandiflora*, was planted ten years earlier, in 1750.

The latest-planted of these trees and shrubs are contemporary with the foundation of Kew, and the little Paduan Garden undoubtedly contains a collection of exotics imported long ago of the greatest interest.

HUGH FARMAR.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1950 AND 1951

FRUIT

Apple 'Merton Worcester,' A.M. September 26, 1950. Raised by Mr. M. B. Crane of the John Innes Horticultural Institution. Parentage 'Cox's Orange Pippin' × 'Worcester Pearmain.' Accepted for trial in 1934. Dessert. September-October ; ripens a few days after 'Worcester Pearmain' and keeps slightly longer. The fruit is medium, regular, round slightly conical. Colour is creamy-yellow nearly covered with a scarlet flush and with some mottling of russet. Flesh is firm, crisp, very juicy, sweet with a slightly aromatic flavour. The tree is rather spreading in habit and buds freely. It is a very free cropping variety with an attractive fruit of good shape and quality. Useful for either private gardens or for commercial growers.

Apple 'Merton Prolific,' A.M. November 7, 1950. Raised by Mr. M.B.Crane of the John Innes Horticultural Institution. Parentage 'Cox's Orange Pippin' × 'Northern Greening.' Accepted for trial in 1939. Dessert. November to February. The fruit is medium, regular, round slightly flat. Colour is green turning to pale yellow with half to three-quarters of the surface covered with a diffuse carmine flush and distinct stripes of a slightly darker hue. Flesh is creamy-white, firm, juicy, sweet and of pleasant flavour. The tree is rather upright in habit and buds very freely. An aptly named variety as it carries heavy crops regularly. The fruit when picked is a dullish green but takes on an attractive hue after a few weeks in store. A variety which might well succeed where 'Cox's Orange' fails.

Apple 'Winston,' A.M. February 16, 1951. Introduced by Messrs. Pope of Wokingham. Parentage said to be 'Cox's Orange Pippin' × 'Worcester Pearmain.' Accepted for trial in 1935. Dessert. January to beginning of April. The fruit is medium to medium small, regular, round to slightly conical and practically covered with a deep crimson flush and stripes. The flesh is very firm, sweet and juicy and of good flavour. A free and regular cropper. Makes rather an upright tree and buds very freely. The fruit tends to be rather small in areas with a low rainfall but it is a good quality apple, keeping excellently with very little waste.

TREES AND SHRUBS

Magnolia Campbellii, White form F.C.C. April 3, 1951. The branch of this variety exhibited bore three large, cup-shaped, cream-tinted flowers; each of which had twelve concave, obovate petals 5 inches long and about 3 inches wide surrounding a bold central cluster of purplish-rose stamens. The tree from which they were cut was raised by the late Mr. J. C. Williams from a seed sent to him from India. Exhibited by C. Williams, Esq., M.P., Caerhays, Gorran, Cornwall.

BOOK NOTES

"Wild Flowers of Chalk and Limestone." By J. E. Lousley. 254 pp. Illus. (Collins, New Naturalist, No. 16.) 21*s*.

This most recent botanical volume in the *New Naturalist* series will be deservedly popular amongst the many amateur naturalists who have already found something of the wealth and beauty of our native flora, and wish to know more about the plants of those chalk and limestone regions where the greatest variety of wild flowers is to be seen. Few British botanists have a detailed knowledge and experience of the habitats of these plants to rival the author's; and he is to be congratulated on the way in which he has communicated his own enthusiasm through the pages of this book.

Mr. Lousley is very well aware of a possible danger in writing such a book, that it may be used by unscrupulous collectors as a guide to localities for our rarest plants, and he has therefore carefully avoided precise mention of a number of habitats; but he realises that the negative suppression of information is less important—and in the long run less effective—than a positive attempt to educate people to appreciate, respect, and take an active interest in conserving, the British flora.

The plan of the book is simple. After an introductory chapter there follow two chapters on the vegetation of Box Hill, chosen as being a convenient and satisfactory introduction to the calcicolous flora of our islands; then the main chalk and limestone are surveyed in order through the rest of the book. These surveys are essentially the comments of a field botanist who is frankly and unashamedly fascinated by the "good" plants—that is, the plants which are local or rare, and often also beautiful in themselves. Since the title should not in fact have led the reader to expect a different treatment, the book can be said to have fulfilled the author's purpose very adequately. It is perhaps a little surprising that aspects of distribution of the many calcicolous species dealt with have not come in for much discussion, for the interpretation of distributional phenomena is traditionally, and very understandably, the extension of the interest of the amateur botanist. This omission is the more surprising as the author has put together, in an Appendix, a valuable series of distribution maps (based on a "point" system, and not the vice-county one) for 26 of the rarer chalk and limestone plants.

The numerous colour photographs are on the whole very good, particularly the close-ups of individual plants or flowers. There is one obvious error, probably arising from a lateral inversion of the photograph, whereby the caption of Plate 5 misnames the two Orchids shown. The remaining (black and white) photographs and the text-figures are most satisfactory, and the whole is produced with the customary excellence of this series.

S. M. WALTERS

"Flower Production for Market." By J. Hardy. 210 pp. Illus. (Crosby Lockwood & Son, Ltd.). 18*s*. net.

This is a book which should find a place on the bookshelves of growers and students alike. The title may be misleading, for a very wide range of crops is covered, from the production of roots of hardy and rock garden plants to highly specialized pot plant production. In the Introduction the author tells us the "sub-title is not all-embracing" and that "quite a few major crops are omitted." It is surprising, therefore, to find Selaginella and Crassula included as major crops, when pot plant crops such as Geranium, Fuchsia and Coleus are omitted. With these exceptions the major cut flower and pot plant crops are included. The author tells us in the introduction that the chapter concerning "flower roots may appear more applicable to the nursery trade," and one cannot help feeling that the omission of this chapter would have made more space available for greater detail in the growing of hardy plants for cut flower production, and for the inclusion of some major crops which have perforce been omitted.

The details of cultivation given for the twenty-five crops which are included in the book are concise and cover the subject well. The author has generally avoided the mistake of giving more than one method of growing each crop. This, as the author acknowledges, does avoid confusing the reader and is important in books to be used by students. He has also avoided long lists of varieties which also confuse and so soon become out of date. The final chapter dealing with the Packing, Grading and Marketing, rightly emphasizes the need for much greater care in the presentation of cut flowers and plants.

The book is well produced. The photographic illustrations (64 in number) are excellent and help the text considerably, as do the line drawings, but it would have been better in some cases had these been drawn to scale.

WILFRED CORBETT

"Flowers: the Flower-piece in Painting." By Hermine van Guldener, translated from the Dutch by F. G. Renier and A. Cliff. Illus. 35 pp. (Longmans Green & Co.) 30*s.* 0*d.*

Dr. van Guldener, who is scientific adviser to the Rijksmuseum, Amsterdam, has produced an attractive florilegium, covering a period of more than six centuries and preceded by an introduction on the development of the flower-piece. Most of the examples are well chosen and well reproduced, though it must be impressed that the recent Dutch work seems a shade outclassed by contemporary paintings of the Ecole de Paris. How pleasant at last to possess a good colour reproduction of Ambrosius Bosschaert's miraculous "Vase in a Window-sill" at the Mauritshuis. Bosschaert was perhaps the first of the Low Country still-life painters to explore the possibilities of the light background—a device which makes his work appear curiously modern. The Jan Brueghel flower-piece may perhaps trumpet Mr. Bowles or Dr. Krelage further in the field of plant identification, though this particular reproduction is not among the most successful as a record of detail. Artists (but not, I suspect, botanists) will enjoy an unfamiliar painting of Sunflowers by Braque. Other artists represented among the forty plates are Duccio, Crivelli, de Gheyn, van der Ast, Seghers, Fantin-Latour, Cezanne, Renoir, Gauguin, Matisse and Picasso. There are also two attractive pages from Flemish manuscripts of about the year 1500 (though the text of the second of these must surely be the work of an Italian scribe).

The introduction gives some useful information, particularly on the Dutch and Flemish artists, though it does not attempt to treat them with the same fullness that Dr. van Gelder accords them in his recent catalogue of the Low Country still-life paintings in the Ashmolean Museum, Oxford. WILFRED BLUNT

"Gardens and Gardening." 1951. Edited by Frank A. Mercer and Roy Hay. Illus. (Studio). 15*s.* 0*d.*

It would be difficult to think of any gardener for whom the Studio Gardening Annual for 1951 would not be a delightful present, but it will be of special value to those who, unable to attend shows or visit many gardens, wish to keep abreast of developments in gardening. It would also be of the greatest help to those who do not yet know their plants.

This year's issue is devoted to bulbous plants including corms and rhizomes, and their use in the garden is ably dealt with by nine experts.

The illustrations are numerous and varied, portraying either individual flowers, or how bulbs may be used in the garden. It is to be hoped that this edition will be followed by many others each dealing as competently with some special aspect of contemporary horticulture. MORTON

"The Complete Gardening Handbook." By Marion J. Simon, Dickson W. Pierce, Beatrix P. Hendrix, John Elliott. xii + 451 pp. Illustrated. Colour plates. (Macmillan, London; Van Nostrand, U.S.A.) 37*s.* 6*d.* or $5.

This American book, the preface states, "covers the entire field of flower growing from the purchase of the seed packet to the cutting of the blooms and their arrangement in a vase to decorate a room, or in a corsage to adorn a woman's dress." It also treats of a "Small orchard for the home," "How to work a Vegetable Garden," "Garden Pests and their control" and many other matters. All in 450 pages. It will be for American gardeners to judge how far this purpose is achieved for the United States, a country so large that it has to be divided into 32 regions to classify its climatic conditions. English readers, however, will be fascinated by glimpses of horticultural practice in a country so different geographically and socially from their own.

The volume has the pleasant characteristic of American books of lying open flat in the hand or upon the table, a point to which those engaged in book production in this country would do well to give attention. MORTON

"Nature Through the Year." By Frances Pitt. vii + 299 pp. Illus. (Macmillan). 18*s.* 0*d.*

Those who have had their crocuses and peas eaten by mice, prunus buds devoured by bullfinches, plant labels carried away by magpies, and rock-gardens tunnelled by moles, may be excused if they sometimes wish that natural history were represented in the garden only by plants. Nevertheless, those who take an interest in its wild life have their pleasure in the garden greatly enhanced, and will find much to enjoy in this book by a distinguished writer on natural history subjects. It is mostly concerned with animals and birds and each of its fifty-two chapters is about what may be seen each week as the seasons go by. MORTON

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ORCHID COMMITTEE—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and twelve other members present.

Awards recommended:

Silver Flora Medal

To Messrs. Stuart Low Co., Ltd., Jarvis Brook, Sussex, for an exhibit of Orchids.

Silver Banksian Medal

To Messrs. Sanders (St. Albans) Ltd., for an exhibit of Orchids.

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To *Cymbidium* 'Islander' Exbury var. (*C.* 'Ceres' var. 'Radiant' × *C.* 'Rosanna' var. 'Pinkie') (votes 12 for, 0 against), from E. de Rothschild, Esq., Exbury.

To *Cymbidium* 'Remus' var. 'Sunset' (*C.* 'Regulus' × *C.* 'Joyful' (votes 11 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green.

To *Cymbidium* 'Tinsel' var. 'Brocade' (*C.* 'Pearl Magnificum' × *C.* 'Babylon') (votes 10 for, 0 against), from H. W. B. Schroder, Esq., Dell Park, Englefield Green.

To *Miltonia* 'Lingwood' (*M.* 'Princess Mary' × *M.* 'Mrs. J. B. Crum') (votes 9 for, 0 against), from Messrs. Black & Flory, Ltd., Slough, Bucks.

To *Odontioda* 'Avala' var. 'Whatcroft Hall' (*O.* 'Sabrina' × *O.* 'Argia') (votes 13 for, 0 against), from Dr. Wm. Stirling, Whatcroft Hall, nr. Northwich, Cheshire.

To *Odontoglossum* 'Welland' (*O.* 'Iden' × *O. crispum*) (votes 9 for, 3 against), from Sydney Tharp, Esq., 10 Farm Lane, Purley, Surrey.

Cultural Commendation

To Mr. E. J. Tompkins, gardener to His Grace the Duke of Marlborough, Blenheim Palace, Woodstock, for an exceptional plant of *Cymbidium Alexanderi* bearing eighteen spikes.

To Mr. E. J. Tompkins, gardener to His Grace the Duke of Marlborough, Blenheim Palace, Woodstock, for an exceptional plant of *Cymbidium Pauwelsii* bearing ten spikes.

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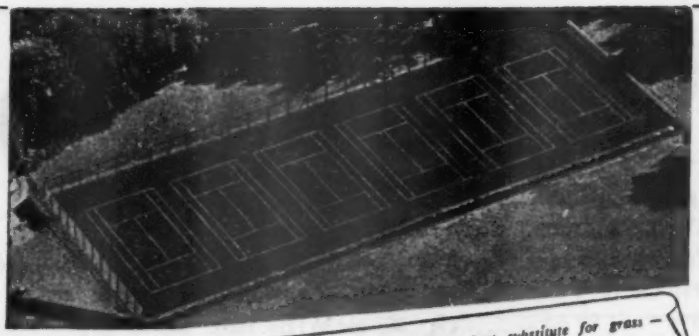

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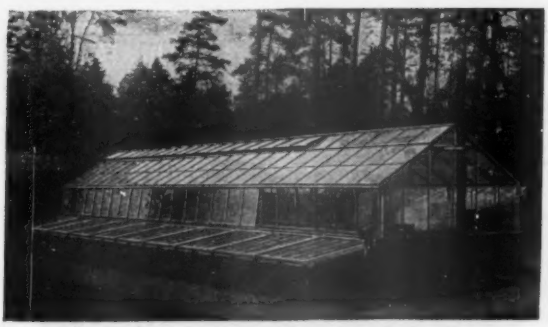

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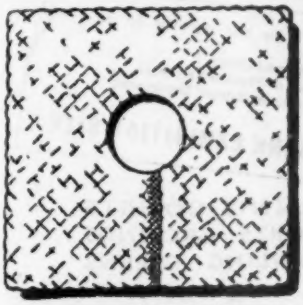

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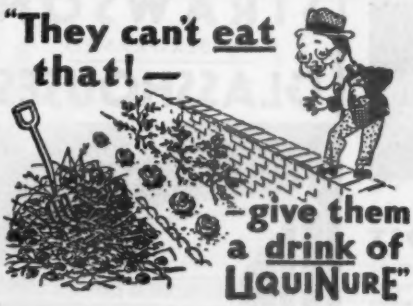

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3	9–11	½	119/11	66/9	14/10
4	6–8	½	95/5	57/–	12/9
4	12–14	½	149/–	85/3	19/–
4	18–20	½	231/–	129/–	29/8
4	24–26	½	313/6	165/9	36/10
5	18–22	½	253/–	138/6	30/10
5	24–26	½–⅝	313/6	165/9	36/10
6	22–26	½	294/3	156/–	34/8
6	28–32	½–⅝	363/–	187/–	41/3
7	28–32	½	365/2	188/–	42/–
7	36–40	½–⅝	418/–	215/4	47/10
8	40–45	⅝	484/–	252/6	56/–
9	45–50	⅝	550/–	282/2	62/9
10	50–55	⅝	566/6	294/6	65/6
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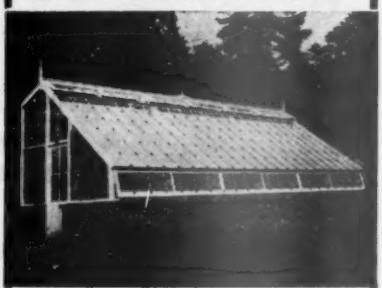

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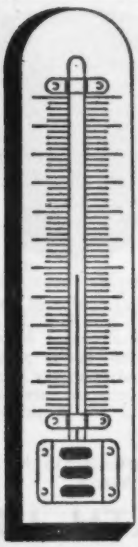

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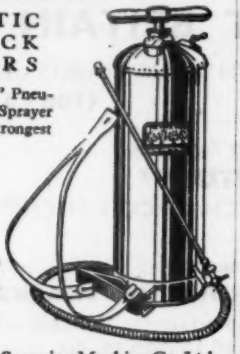

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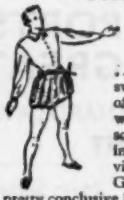

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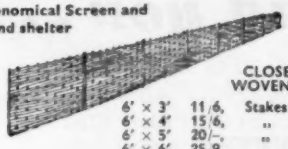

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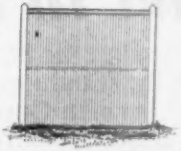

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